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THE CLIMATE CHANGE AND FRESHWATERS NEXUS: POSSIBLE IMPLICATIONS FOR WATER TREATIES ON THE TRANSBOUNDARY TRIBUTARIES OF THE CONGO RIVER

(A study with comparative references to selected foreign transboundary rivers)

This thesis is submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy

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November 2019

Statement of originality

I, Joseph Malassi Longunza declare that

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Conference Presentation

A paper of this thesis titled "The climate change and freshwaters nexus: possible implications for water treaties on the transboundary tributaries of the Congo River (a study with comparative references to selected foreign transboundary rivers)" was presented at the "African Society of International Law (AfSIL) – 8th annual conference", held in Durban, South Africa, on the 25 and 26 October 2019, under the theme: "The implementation of International Environmental Law at the Domestic level".

Abstract

While it is widely predicted that climate change will cause a significant decline of water availability in diverse regions of the planet, it is also established that the same phenomenon will cause frequent and intense floods in many other regions of the globe, including the Congo River basin, in Central Africa. This basin, which houses the second-largest tropical rain forest in the world is under threat of seasonal floods due to climate change. Studies concerning the impact of climate change on the basin's hydrology have revealed that the phenomenon will cause an increase of approximately 10 to 15 percent of the run-off of the basin, and a rise of about 11 to 17 percent of the Congo River's discharge, by the year 2050. The Congo River is the main outlet of the Congo basin. It discharges approximately 45,000 cubic metres of waters per second in the Atlantic Ocean, of which one third are the waters from the Congo River's transboundary tributaries. Eleven to seventeen percent in addition to what already exists suggests a higher likelihood of intense seasonal floods across the Congo River basin. The 1997 United Nations Convention on the non-navigational uses of international watercourses has required water cooperation across river basins in order to jointly adopt the appropriate measures including the laws, to address the predicted impacts of climate change. However, the consulted literature has given very little interest in this matter as far as the Congo River basin is concerned. Furthermore, no previous study has examined the legal implications thereof. This thesis has, therefore, tried to comprehend the implications that these climate change impacts on the hydrology of the Congo River basin will have on the laws that govern the Congo River and its transboundary tributaries. This thesis has at first assessed the legal framework that governs the Congo River and its transboundary tributaries against *Cooley & Gleick's criteria framework,* which verifies the integration of the climate change dimension in transboundary water treaties. At a second stage, this thesis has undertaken a comparative analysis of the said regime with the flood management regime that is in place in the Rhine River basin. From the analysis undertaken in this thesis, it has transpired that the legal regime that governs the Congo River and its transboundary tributaries has not adequately integrated the climate change dimension. Furthermore, it is deprived of any flood management provision or mechanism, thus suggesting an alarming vulnerability to floods along the Congo River especially. Inspired by the Rhine flood management regime, and having elucidated the hydro politics at play across the Congo River basin, this thesis has formulated some critical recommendations that aim at equipping the basin with an adequate flood management legal regime.

Acknowledgements

I would like to first thank the one I bow before, the Lord Jesus Christ for his clemency which has brought me through to the end of this thesis. Thanks as well to all the fellow members of the Golden Age Tabernacle, who stood on my side all these years. I will never forget their love and sacrifices, in particular, sisters Albertine, Shozi, Sondezwa and Jane Jaly for their material and financial support. Godfrey Gamanya, my beloved friend, you are not forgotten. My special appreciations and thanks go to my most appreciated supervisor, Professor Michael A. Kidd, who believed in my potential to achieve this prowess. Not only did he believe, but he also took the necessary steps towards the realisation of what he believed, from this thesis' conception to its finalisation. I will always be grateful to have benefited from his gigantic experience in this field, grateful to have learned the basics of environmental law and explored the greatness of the art at the feet of this giant. I would also like to acknowledge the financial assistance of the University of KwaZulu-Natal, which has wholly funded the studies towards this thesis. Particular thanks go to those that have assisted with some advice and have helped edit the thesis, namely Miss Bulelwa Kosani, Miss Masithembi, and Professor Moleka Mosisi. They have all significantly contributed in putting me on the "right track", often in a timely manner, as I was faced with the complexity of the academic writing. I will not forget my family members, especially my wife Ruth Malassi, my kinsfolks Justin Lindongo, Bassongo Ngosso, Sandra Mwaissa, and my children Gabriel, Angelina, Emmanuelle, Michaelle and Deborah who, if it was possible, would have wilfully assisted me to complete this thesis.

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Lists of abbreviations

CAR	:	Central African Republic
CBDR	:	Common But Differentiated Responsibility
CEMAC	:	Central African Economic and Monetary Community
CICOS	:	International Commission of the Congo, Oubangui and Sangha Rivers
COP	:	Conference of the Parties
CSC	:	Climate Service Centre
EC	:	European Commission
ECCAS	:	Economic Community of Central African States
ECU	:	Equatorial Customs Union
EEA	:	European Environment Agency
EIA	:	Environmental Impact Assessment
EU	:	European Union
FAO	:	Food and Agriculture Organisation of the United Nations
FRMP	:	Flood Risks Management Plan
GHG	:	Greenhouse Gas
GWP	:	Global Water Partnership
ICJ	:	International Court of Justice
ICPR	:	International Commission on the Protection of the Rhine
ICID	:	International Commission on Irrigation and Drainage
ILA	:	International Law Association
ILC	:	International Law Commission
IPCC	:	Intergovernmental Panel on Climate Change
ICPDR	:	International Commission for the Protection of the Danube River
IIL	:	International Institute of Law
IISD	:	International Institute for Sustainable Development
IUCN	:	International Union for Conservation of Nature and Natural Resources
IWRM	:	Integrated Water Resource Management
LCBC	:	Lake Chad Basin Commission
NBI	:	Nile Basin Initiative
NGO	:	Non-Governmental Organisation

NRC	:	Norwegian Refugee Council
MEA	:	Multilateral Environmental Agreement
NASA	:	National Aeronautics and Space Administration
NDC	:	National Determined Contributions
ND-GAIN	:	Notre Dame Global Adaptation Index
OECD	:	Organisation for Economic Cooperation and Development
PCA	:	Permanent Court of Arbitration
PCIJ	:	Permanent Court of International Justice
PRC	:	Pew Research Center
RBMP	:	River Basin Management Plan
SADC	:	Southern African Development Community
SARDC	:	The Southern African Research and Documentation Centre
SDG	:	Sustainable Development Goals
SEG-CC	:	Scientific Expert Group on Climate Change
SFG	:	Strategic Foresight Group
TVA	:	Tennessee Valley Authority
UN	:	United Nations
UNDP	:	United Nations Developmemt Programme
UNESCO	:	United Nations Educational, Scientific and Cultural Organization
UNFCCC	:	United Nations Framework Convention on Climate Change
UNGAS	:	United Nations General Assembly
UNECA	:	United Nations Economic Commission for Africa
UNECE	:	United Nations Economic Commission for Europe
UNECE WCC	:	United Nations Economic Commission for Europe Watercourses Convention
UNEP	:	United Nations Environmental Programme
UNISDR	:	United Nations International Strategy for Disaster Reduction
UNWCC	:	United Nations Watercourses Convention
USA	:	United States of America
US-GCRP	:	United States - Global Change Research Program
WBG	:	World Bank Group
WCD	:	World Commission on Dams
WMO	:	World Meteorological Organisation
WWAP	:	World Water Assessment Programme

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DEDICATION

To all those I have ever loved,
and to all those who have ever loved me,
I dedicate this thesis.

PART I: GENERALITIES TOWARDS THE THESIS

1 INTRODUCTION

The aim of this thesis is to investigate the extent to which the legal framework that governs the Congo River and its transboundary tributaries has integrated the climate change dimension. Such an investigation will be done with the aim of identifying possible gaps in the legal regime that governs this transboundary water system, and from there formulate some appropriate recommendations in order to equip the Congo River basin with climate-proofed transboundary water treaties. With a flow rate estimated to approximately 45,000 cubic metres per second, the Congo River, in the central region of Africa, ranks the first water richest river of Africa, and the second of the world after the Amazon River, in South America. As the climate change phenomenon continues to impact negatively the planet's freshwater resources, mitigation and adaptation measures are being taken worldwide in order to limit the negative effects of climate change on people and societies. Regarding the impacts of climate change across the Congo River basin, the predictions announce a significant rise of up to 17 percent of the river flows of the basin, by the year 2050, thus suggesting a strong likelihood of frequent floodings during the wet seasons in the basin's flood-prone areas particularly. It is, therefore, due to such prediction that there is a pressing need for ensuring that the legal regime that governs the Congo River and its transboundary tributaries are climate-proofed and address in a specific way this prediction of climate change impact across the basin. An adequate flood management agendas centred around the Congo River and its transboundary tributaries may contribute to mitigate significantly these predicted impacts of climate change across the basin. In addition, such programs may offer the opportunity to better manage the predicted excessive seasonal waters that will be flowing through the Congo River and its tributaries, for the purpose of water transfer towards some surrounding water-stressed regions northwards and southwards the Congo River basin. The agreements that were negotiated on transboundary water resources before the advent of climate change were generally negotiated to promote peace, cooperation, and economic development among the signatory states. Because of climate change, it is recommended that these categories of agreements may include suitable mechanisms that will help the signatory states to cooperatively address the impacts of climate change that are predicted on the shared water resources.

1.1 Background of the study

In recent years, the impacts of climate change on water resources have received considerable attention from scholars and actors interested in this topic.[1] A large and growing body of literature has established that the changes that are observed in the planet's climate system, which are generally referred to as "climate change" have significant impacts on the planet's freshwater resources.[2] Impacts are the effects of climate change on lives, ecosystems, and livelihoods.[3] Phenomena such as rainfall variabilities and instabilities, decreasing levels of river runoffs, freshwater depletion, floodings and droughts, to name only these few, that are increasingly observed worldwide, have all been linked to the climate change phenomenon.[4]

There is a wide consensus among scientists that the disproportionate emission of anthropogenic greenhouse gases from all over the world has, to a greater extent, caused the current episode of climate change.[5] The Intergovernmental Panel on Climate Change (IPCC)[6] has reported that anthropogenic emissions have already caused around 1.0

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[1] The Intergovernmental Pannel on Climate Change (IPCC), the United Nations Organisation (UN) and some of its specialised agencies (FAO, UNDP, UNICEF, UNESCO), the World Bank, to name but a few, have all a series of annual reports that discuss the water resources and climate change nexus. See section 2.2.6 below for details on climate change and waters; In the sense of this thesis, and unless otherwise specified, "Water resources" or "waters" will always refer to freshwaters.

[2] See section 2.2 below for further details.

[3] B. Bates *et al. Climate change and water* (2008) Technical Paper, 3.

[4] IPCC (2014) (c) *Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2014), 1048.

[5] See section 2.2 below; B.E.C. Jiménez *et al.* 'Freshwater resources' in C.B. Field *et al.* (eds.) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2014) 229, 234-235; J.K.Casper *Greenhouse gases: worldwide impacts* (2010), 10.

[6] The Intergovernmental Panel on Climate Change [Hereinafter IPCC] is a cosponsored independent scientific body, established in 1988 and consisting of over 2000 scientific and technical experts from around the world, which collect scientific information on the causes of climate change, its potential effects and possible mitigation strategies. The IPCC publishes every 7 years a report entitled 'Climate change Assessment Report' (AR), which informs on the drivers of climate change, its impacts, future risks, and on its adaptation and mitigation strategies. See for further details: *https://www.ipcc.ch/organization.shtml, a*ccessed on 12 February 2018.

degrees Celsius of additional global warming above the pre-industrial levels; and will continue doing so until reaching approximately 1.5 degrees Celsius, between the years 2030 and 2052 in a business as usual scenario.[7] While climate predictions announce an increase of the global temperature of nearly 3.3 degrees Celsius in the horizon 2100,[8] recent discoveries have established that every additional degree Celsius to increase in the global temperature will cause a drop of approximately 20 percent in the availability of freshwaters for 7.0 percent of the planet's population.[9] The detection of such a correlation between the planet's climate system and water resources is regarded as one of the most vital discoveries of this modern epoch.[10]

Analysing the relationship between the climate change and the planet's water resources, the United Nations Development Programme (UNDP) found that it will be through water quantity and quality that people from all over the world will experience most the negative impacts of climate change.[11] This is nothing less than disturbing if one can only consider the importance of freshwaters in human lives and societies, and yet being negatively

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[7] IPCC (2018) (f) *Summary for Policymakers in: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (2018), 6.

[8] The National Determined Contributions [hereinafter NDC] is a strategy under the 1992 UNFCCC and reiterated in the 2015 Paris Agreement on climate change for the reduction of global CO_2 emissions. See section 2.2.5 for further details; A. Brisman *et al. Water, crime and security in the twenty-first century: Too dirty, too little, too much* (2018), 54.

[9] D. Arjoon *et al.* 'Sharing water and benefits in transboundary river basins' (2016) 20 (6) *Hydr&ESySc*, 2135, 2136; J. C. Sanchez & J. Roberts *Transboundary Water Governance: Adaptation to Climate Change*. (2014), XV; Jiménez *et al.* (note 5 above; 229-232).

[10] IPCC 2014 (b) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2014), 1761.

[11] The UNDP is a United Nations Institution which was established in the 1950s. Its mandate is to eradicate poverty while protecting the planet. See for more details on the UNDP https://www.undp.org/ accessed on 15 July 2019; WWAP (a) *The United Nations World Water Development Report: Managing Water under Uncertainty and Risk* (2012), 10.

impacted due to the continual deterioration of the earth's climate system.[12] According to the World Water Assessment Programme (WWAP),[13] there are already 2 billion people worldwide who live in countries that experience higher water stresses, and around 4 billion who suffer severe episodes of water scarcity for at least one month a year. Because of a falling availability and a continually rising demand, the WWAP announced a global water deficit of around 40 percent by the year 2030.[14]

While it is widely established that climate change will cause a significant decline of water availability in several parts of the planet, it is equally predicted that the phenomenon will be causing floods in some flood-prone parts of the world, during the wet seasons especially.[15] These floods will be caused by excessive rainfalls. It was on that basis that the UN announced that by the year 2050, there will be worldwide around two billion people who will be vulnerable to floods.[16]

In Africa, for instance, reports say that floods are already causing significant damages, including an increasing number of human displacements, and important material damages.[17] In 2009, there were around 2.5 million displaced people across the continent

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[12] UNEP (a) *Transboundary River Basins: Status and Trends* (2016), 1; F. Hans 'List the Top 5 Natural Resources' available at *https://sciencing.com/list-top-5-natural-resources-8179774.html*, accessed on 23 March 2019.

[13] WWAP (c) *The United NationsWorld Water Development Report: Leaving No One Behind* (2019), 1. The The United Nations World Water Development Report (WWAP) is a report produced by UN-Water, which is a UN Agency that coordinates the efforts of all UN entities and other international organisations that work on the field of water and sanitation.

[14] WWAP (b) *The United NationsWorld Water Development Report: Water for a Sustainable World* (2015), 11.

[15] Coulibaly *et al.* 'The 10 impact of climate change and extreme events on agriculture in Africa' (2019) *We In Gr & Sus* 261; Bischiniotis *et al.* 'The influence of antecedent conditions on flood risk in sub-Saharan Africa' (2018) 18 (1) *Nat Haz & Ear Sys Sc* 271-285; See Gemeda *et al.* 'The impacts of climate change on African continent and the way forward' (2015) 10 (7) *J'l of Ec & the Nat env* 256; Brisman *et al.* (note 8 above; 54).

[16] UNU 'Two Billion People Vulnerable to Floods by 2050' (Press Release, June 13, 2004), available at *http://www.unu.edu/news/ehs/floods.doc*, accessed on 07 July 2019. Deforestation and demographic expansion in flood-prone regions are other factors that exacerbate communities vulnerability to floods.

[17] See P. Schewe 'Fatal Floods in Africa'(December 16, 2010), available at *https://phys.org/news/2010-12-fatal-africa.html,* accessed on 23 March 2019.

because of floods.[18] Schewe[19] reports that more than 15,000 Africans died due to floods between the years 2000 and 2009, although some of these casualties were not directly associated with the flood itself, but with the phenomenon's aftermath.

Whether water-scarce conditions or massive displacements of people across state's boundaries because of floods or any other reason are all feared because of the potential to nurture water competitions, tensions, and escalating violence among water users. The recent conflict in the Darfur, in South Soudan, offers compelling evidence to this.[20] That is why the climate change-freshwaters nexus has become a cause of concern, in transboundary contexts in particular. [21]

Be it for floods or decreasing water availability, river basins are predicted to be the epicentres of most of the above negative impacts of climate change on water resources.[22] There are worldwide nearly 310 international river basins.[23] They represent 47.1 percent of the planet's land surface and are home to 52 percent of the world's population.[24] Because of such sizes of land surface and population, Sanchez[25] claimed that the impacts of climate change would be particularly severe in transboundary contexts.

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[18] *Ibid*.

[19] *Ibid*.

[20] United Nations Security Council *Report of Meeting 7818* (November 22, 2016), 2.

[21] J. Fried 'Book Review' in S. Sangam *et al.* (eds) *Climate Change and Water Resources* (2014), ix; A nexus means "an important connection between the parts of a system or a group of things" see definition in *https://dictionary.cambridge.org/dictionary/english/nexus* , accessed on 20 June 2018.

[22] See IPCC (c) (note 4 above; 1048); M.A. Palmer et al. 'Climate change and the world's river basins: anticipating management options' (2008) 2 (6) *Front in Eco & Env* 81, 83; Sanchez & Roberts (note 9 above; XV); Jiménez *et al.* (note 5 above; 229-232).

[23] M. Mccracken & A.T. Wolf 'Updating the Register of International River Basins of the world' (2019) *Int J of Wat Res Dev* 1, 2-3; In the consulted literature, transboundary river basins are sometimes referred to as international river basins. See sections 2.3 and 2.4 below for further discussions on both concepts.

[24] The consulted literature is not constant on the number of transboundary river basins worldwide; The figure of 310 river basins includes Lake Basins; See J. W. Dellapenna *The Customary International Law of Transboundary Fresh Waters* (2001) 1 *Int J Glo Env Iss* 264, 265; *See* U.N.Water *Transboundary Waters* (2013), 26. See section 2.4 for further details on transboundary waters.

[25] Sanchez & Roberts (note 9 above; XV).

Having considered the central role of the law in human societies, Nukulchai[26] recently declared that there was a growing need to identify what would be the implications of the impacts of climate change on the laws that govern the transboundary water resources. Somewhat in the same logic, Perlman[27] stressed the necessity of understanding and preparing anticipatively riparian states to the effects of climate change on transboundary water resources. Similar as Perlman, the IPCC[28] claimed on its side that understanding anticipatively the effects of climate change at river basin level could motivate riparian states to adopt joint mitigation and adaptation measures concerning a shared water resource, thus contributing to the promotion of peace, cooperation, sustainability, and development across transboundary river basins.[29]

The call from both the IPCC and Perlman were critical since most of the transboundary river basins of the world are not equipped with water treaties that are responsive to climate change.[30] In a study on the interplay between climate change and water resources, Bates[31] noticed that half of the world's transboundary river basins were uncovered with any water agreement, whereas the agreements that were in place failed to take climate change into account. In the same order of ideas as Bates, Wouters[32] found that two-thirds of the world's river basins were uncovered by any water agreement. In Africa, in particular, Bakker[33] found that only 25 of the continent's 63 transboundary river basins were covered with some water agreements, of which almost all did not deal with climate change.

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[26] Fried (note 21 above; ix).

[27] P. Perlman *et al.* 'International water conflict and cooperation: challenges and opportunities' (2017) 2 (42) *Wat Int'l* 105,117.

[28] See IPCC (c) (note 4 above; 1048).

[29] See section 2.2.5.1 below for more details on adaptation and mitigation.

[30] S. Blumstein *et al.* 'Water and climate diplomacy: Integrative approaches for adaptive action in transboundary river basins' Working Paper (2016), 6. Available at *www.adelphi.de,* accessed on 03 October 2018.

[31] Bates *et al.* (notes 3 above, 3) ; *Ibid*. Blumstein at 16.

[32] P. Wouters 'Dynamic Cooperation'—The Evolution of Transboundary Water Cooperation' *in* M. Kidd *et al.* (Eds.) *Water and the Law: Towards Sustainability* (2014) 13, 63.

[33] M.H. Bakker & A.J. Duncan 'Future bottlenecks in international river basins: where transboundary institutions, population growth and hydrological variability intersect' (2017) 42 (4) *Wat Int'l* 400, 407-408. In this Article, Bakker & Duncan speak about 64 River basins instead of 63 as adopted in this thesis.

The Congo River basin, in the central region of Africa, is one of the 63 transboundary river basins of Africa.[34] It is shared by nearly ten riparian countries, has a flow rate of approximately 45,000 cubic metres per second, and carries about 32 percent of the continent's freshwater resources.[35] In spite of that, observers have raised the fact that the Congo River and its tributaries were among the most poorly regulated transboundary river systems in the world, with only limited consideration given to the predicted impact of climate change on the waters of the basin.[36]

Haensler *et al.*[37] studied the impacts of climate change on the hydrology of the Congo River basin and found that the phenomenon would cause an increase of up to 10 percent of the waters of the basin. Beyene *et al.*[38] also analysed the Congo basin's hydrology and predicted an increase of approximately 10 to 15 percent of the run-off of the basin, besides an increase of 11 to 17 percent of the Congo River's discharge, by the year 2050. Both Haensler *et al.* and Beyene's findings suggest higher flood risks throughout the Congo River basin, and in particular in the basin's flood-prone areas.[39] That is the reason why the riparian states of the Congo River and its tributaries are to take the necessary steps to adopt the appropriate legal measures whether at the basin or at country levels, to improve the preparedness of the basin to the impacts of climate change as predicted above.[40]

The other thing is, there has been since a certain time, a growing pressure from some African regional forums on the DR-Congo to accept the transfer of its water resources to the Chad Lake to replenish this last.[41] The DR-Congo's waters to be transferred

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[34] See chapters 8 and 9 below.

[35] UNEP (a) *Africa Water Atlas* (2010), 41; A.H. Conley 'The need to develop the water resources of Southern Africa' In *Conference of Southern African Society of Aquatic Scientists, Zimbabwe* (1996), 41.

[36] See section 6.3.2. below for more details.

[37] Haensler *et al.* 'Assessment of projected climate change signals over central Africa based on a multitude of global and regional climate projections' In A. Haensler *et al.* (eds.) *Climate Change Scenarios for the Congo Basin* (2013), 23 & 32.

[38] T. Beyene *et al.* 'The potential consequences of climate change in the hydrology regime of the Congo River Basin' in A. Haensler *et al.* (Eds.) *Climate Change Scenarios for the Congo Basin* (2013), 41.

[39] *Ibid* Beyene, 18-20.

[40] *Ibid*.

[41] The Democratic Republic of the Congo [hereinafter DR-Congo] is a state in the central region of the African continent. See further details on the DR-Congo in section 6.4.2 below.

to Lake Chad are to be drawn either from the Congo River or from one of its transboundary tributaries. The DR-Congo and a few other co-riparian States are reluctant to such an initiative, whereas some other riparians are supportive of it.[42]

In a study on conflicts over water resources in river basins, Roy[43] found three ways under which disagreements may arise among the riparian States of a river basin, including the situations where one riparian State transfers or projects to transfer waters from the basin without prior agreement with the other riparian states. In the same order of ideas, Ashton[44] shows that in Africa, water disputes often related to accusations that a transboundary water resource and its benefits are not equitably shared among the riparian states.[45] Roy and Ashton's findings recall that a transboundary context where there is no existing agreement or institutional mechanism to share water resources or the benefices thereof becomes conducive to conflicts.[46]

The ongoing *Bolivia vs Chile* case seems to offer an eloquent illustration in this regard.[47] Pressed by water shortages, the two countries are currently pending before the International Court of Justice (ICJ) over the ownership of the Silala River.[48] The Silala conflict is occurring even though both countries are among the water-richest countries in

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[42] On the positions of the riparian states of the Congo River, see section 6.4 below.

[43] D. Roy et *al.* 'Ecosystem Approaches in Transboundary Integrated Water Resources Management: A Review of Transboundary River Basins (2011) *Int'l Inst for Sus Dev* 1, 16; UNEP *et al. Africa water atlas* Vol. 1 (2010), 42.

[44] P.J. Ashton 'Disputes and conflicts over water in Africa' (2007), 4.

[45] *Ibid.*

[46] UN-Water 'Transboundary waters: sharing benefits, sharing responsibilities' (2008) *Thematic Paper* 20, 9-11.

[47] See ICJ 'Chile Institutes Proceedings against Bolivia with Regard to a Dispute Concerning the Status and Use of the Waters of the Silala' No. 2016/16 (June 6, 2016) available at *http://www.icj-cij.org/docket/files/162/19018.pdf* , accessed on 7 October 2018; See also C.R. Rossi 'The Transboundary dispute over the waters of the Silala/Siloli: Legal vandalism and Goffmanian Metaphor' (2017) 53 *Stan j int'l l* 55, 56.

[48] The ICJ is the main judicial organ of the United Nations Organisation (UN). It was instituted in June 1945, under the UN Charter, and began its operations in April 1946. It has replaced the Permanent Court of International Justice. The ICJ seats is in The Hague, Netherlands, at the Peace Palace. The ICJ is the only principal organ of the UN, which is not located in New York, USA. Its mission is to settle, in accordance with the International Law, any legal disputes, which is submitted to it by the member States of the Organisation, and to give advisory opinions on legal matters, which may emanate from UN organs and specialised agencies. Information available at *http://www.icj-cij.org/* , accessed on 14 April 2.

the world,[49] and that for decades they have both peacefully shared the waters of the contested river. As argued by Kidd,[50] the *Bolivia vs Chile* case highlights the forms that the looming water crisis may take worldwide in the near future. This *Bolivia vs Chile* conflict seems to recall that in the absence of climate-proofed agreements on shared water resources, conflicts are likely to burst even between states that have in their history shared water resources peacefully.[51]

Although the predictions of climate change across the Congo River basin announce in general seasonal overabundance of waters and high risks of floods in the basin's flood-prone areas as mentioned earlier, the legal framework that governs the Congo River and its transboundary tributaries deserves a particular attention, as the basin will need to improve its overall preparedness to floods management.

1.2 Problem statement

Under climate change circumstances, Beyene *et al.*[52] predict an increase of approximately 10 to 15 percent of the run-off across the Congo River basin, and an increase of 11 to 17 percent of the Congo River's discharge, by the year 2050. These increases will be particularly high during the wet seasons, as compared to the dry seasons.[53] The same authors predict an increase in the basin's run-off of approximately 23 to 27 percent, against an increase in the Congo River's discharge of approximately 18 to 73 percent at the end of the current century.[54] Both predictions suggest that there is a strong likelihood of frequent floodings across the Congo River basin. This thesis will, therefore, address a threefold problem that relates to these series of findings as far as the legal regime that governs the

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[49] See Total renewable water resources *World Factbook* (2016) available at *https://www.cia.gov/library/publications/the-world-factbook/fields/2201.html* (this publication has listed Bolivia and Chile among the water-richest countries in the world, yet engaged in a transboundary water conflict).

[50] M. Kidd & L. Feris '*Introduction*' Water and the Law—Towards sustainability' in M. Kidd *et al.* (eds) *Water and the Law: Towards sustainability* (2014). This study has noted various reports proclaiming fresh water as the environmental crisis of the twenty-first century.

[51] World Factbook (note 49 above); See Chapter 5 for further details on the Congo River and its riparian states.

[52] Beyene *et al.* (note 38 above; 17-20).

[53] *Ibid*. at 18.

[54] *Ibid*. at 18-20.

Congo River and its transboundary tributaries is concerned. *Firstly*, the Congo River and its transboundary tributaries seem legally ill-equipped to cope with the predicted impact of climate change on the waters of the basin. *Secondly*, from the available review of literature, no previous investigation has been carried out on the legal implications of flooding across the Congo River basin as an impact of climate change. *Thirdly*, the possibility of undertaking water transfer from the Congo River or its transboundary tributaries under adequate flood management regime.

1.3 Research objectives

Against this background, the thesis sets out to investigate the extent to which the legal framework that governs the Congo River and its transboundary tributaries has integrated the climate change dimension. In that perspective, this thesis will:

1. examine the existing agreements which apply to the Congo River and its transboundary tributaries;
2. assess the adequacy of the agreements on the Congo River and its transboundary tributaries in addressing the predicted impacts of climate change on the waters of the Congo River basin;
3. formulate recommendations regarding the legal regime that governs the waters of the Congo River and its transboundary tributaries for more responsiveness to the predicted impacts of climate change across the Congo River basin.

1.4 Research questions

The central question which this thesis will investigate is: “To what extent has the legal framework that governs the Congo River and its transboundary tributaries taken into account the climate change phenomenon and its impacts on water resources in the Congo River basin?” To answer its central question, this thesis will focus on the two following sub-questions: “Have climate change considerations been adequately integrated into the existing agreements on the waters of the Congo River and its transboundary tributaries?”, and, “How far has the legal framework that governs the waters of the Congo River and its transboundary tributaries dealt with the predicted impacts of climate change on the waters of the Congo River basin?”

The central question and sub-questions of this thesis are approached with the view of formulating recommendations towards the adoption of a regime for the waters of the Congo River and its transboundary tributaries, which will be responsive to the predicted impacts of climate change on the basin's waters.

1.5 The interest of this study

This study has two interesting aspects. *First*, freshwater is one of the natural resources that the Congo River basin is exceptionally endowed with, because it carries approximately 32 percent of Africa's total volume of freshwaters. Climate change is expected to significantly increase water availability within the Congo River basin while decreasing water in some neighbouring river basins. Such abundant water resources result on the one side in higher risks of floodings across the Congo River basin, and on the other side in growing solicitations for water transfers from the waters of the Congo River basin to supply some water-stressed neighbouring river basins.[55] However, the Congo River and its transboundary tributaries are ill-equipped in terms of climate-proofed transboundary water agreements, for which this study sets out to contribute. *Second*, the study will contribute to the clarification of the legal status of the Congo River, the main outlet of the Congo River basin. This is because the lack of consensus regarding the status of the Congo River among the states of the Congo River basin has in one way or the other contributed to the lack of adequate water agreements targetting the Congo River.

Because of the geographical configuration of the Congo River, its status has long been confusing, as it has its source and mouth within the territorial boundaries of the DR-Congo only, which country the River traverses without ever crossing its national boundaries.[56] No previous study has investigated this issue under climate change circumstances, and neither has any research considered the impacts of climate change on the agreements the riparian states of the Congo River have signed touching the Congo River and its transboundary tributaries. This research, therefore, provides a timely opportunity to advance understanding in that regard. *Lastly*, the integration of the climate change dimension in the legal framework that governs the Congo River and its transboundary

[55] See section 5.6.2 below.

[56] See Annexe 6 and Map 6: The Congo River born and dischaging from within the territory of the DR-Congo.

tributaries will make a significant contribution both in treaty stability and in the promotion of peace and cooperation among the states of the Congo River basin, a region characterised by recurring political and military conflicts.

1.6 The gap to be addressed and the original contribution

In general, the Congo River basin has been given only a little attention by scholars in the past decades, and even much lesser attention regarding the legal implications of the impacts of climate change on its water resources.[57] After intensively researching on climate change adaptation in transboundary river contexts in Africa, Goulden *et al.*[58] concluded that there was need for future studies to review the appropriateness of existing legal frameworks and institutional structures for transboundary water treaties in the context of climate change, and to find new approaches to transboundary water treaties that are better suited for non-stationary hydrological conditions. To the researcher's best knowledge, very few publications were found in the literature that addresses the issue raised by Goulden *et al.*[59] for the Congo River and its transboundary tributaries. None of the rare studies that were found envisaged the legal implications of the impacts of climate change on the waters of the Congo watercourse.

Therefore, this thesis constitutes an original contribution to fill the above gap as raised by Goulden *et al.* concerning the Congo River and its transboundary tributaries. This thesis will also improve the understanding of the status of the Congo watercourse, for which there has already been an episode of conflict between the DR-Congo and the Republic of the Congo, in the 1970s.[60] A clear and shared understanding of

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[57] CSC *Climate Change Scenarios for the Congo Basin* (2013), 1; On the list of the scarce literature dealing with the Congo River in the post-colonial period, one has to mention T. Maluwa (a) 'The origins and development of international rivers in Africa: a study of the international legal regimes of the Congo and the Niger rivers from 1885 to 1960' (1982) 29-3 *NILR* 368; M. Mubiala *L'évolution du droit des cours d'eau internationaux à la lumière de l'expérience africaine, notamment dans le bassin du Congo/Zaïre* (2014), XIX-XXI; M. Mubiala 'Le regime juridique du bassin du Congo/Zaire' (1994) 47 (5) *Stu dip* 53, 72.

[58] M.Goulden *et al.* 'Adaptation to climate change in international river basins in Africa: A review' (2009) 54 (4) *Hy.Sc.J'l* 805, 824.

[59] CSC (note 57 above; 1).

[60] On the conflict between the two Congos on the Congo River, See details in section 6.2.4 below.

the status of the Congo River among its riparian states will contribute to setting the right socio-political environment across the basin for the adoption of and implementation of climate-proofed water agreements. At last, through the improvement of the regime that governs the Congo River and its transboundary tributaries, this thesis will contribute to the sustainability of the environment of the basin, and to its political and social stability.[61]

1.7 Limitation of the study and reasons for selecting the units of analysis and choosing the Congo River and its transboundary tributaries

This thesis will focus on the legal regime that governs the Congo River and its transboundary tributaries. Groundwaters do not constitute the focus of this study; neither does the Tanganyika Lake basin, despite its connection with the Congo River through some in-between water flows.[62] Also, this thesis will only consider the non-navigational uses of the Congo watercourse, and analyse only the legal principles that apply to transboundary water resources, as enshrined in the 1997 United Nations Convention on the Law of Non-Navigational Uses of International Watercourses and its related instrument, which is the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. This is because, at the time of the drafting of this thesis, the 1997 United Nations Convention on the Law of Non-Navigational Uses of International Watercourses is viewed as the most important and legitimate multilateral instrument to have offered a clear, coherent, and comprehensive codification of the customary international law in the field of the transboundary watercourses and river basins.

There is a set of reasons that have led to the choice of the Congo River basin: *Firstly*, its strategic position, from an environmental perspective, being the water-richest river basin in Africa, and the second in the world, after the Amazon, in South America. *Secondly*, the lack of adequate climate-proofed water Agreements to govern the waters of the Congo River and its transboundary tributaries.

The transboundary rivers that are chosen for the comparative analysis include the Rhine and Danube Rivers. These Rivers are selected for two reasons, *First*, under the European Union Directives on water resources of 2000, and the 2007 Directives

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[61] *Ibid*.

[62] See details in section 5.3 below.

on flood management, both rivers seem well equipped with an adequate flood management regime, in comparison to the regime of the Congo River. *Second*, both the Rhine and Danube Rivers share with the Congo River basin similar predictions concerning floods, as a result of climate change disruption on the basins' hydrology.[63] However, due to the fact that the Rhine and the Danube Rivers have the same flood management regime, the Rhine River will constitute the primary context concerning the comparative analysis.

1.8 Research methodology

This thesis is a desktop study. It includes a content analysis of treaties, official reports and statistics from both national and international authoritative institutions**,** especially those that are influential to the regimes of transboundary watercourses in the targeted river basins. This thesis also undertakes a content analysis of relevant scholarly literature and comparative analysis of transboundary water regimes. The transboundary water regime that is chosen for the comparative analysis is principally the flood regime that is in place in the Rhine River basin. However, whenever the need will be to do so, this thesis will make references to some other river basins such as the Danube River basin.

1.9 Structure of the thesis

This thesis is comprised of four parts, with at least two chapters each. Part I provides some generalities towards the thesis. It comprises an introduction (chapter 1) and a review of the key concepts of the study (chapter 2). Under chapter 2, this thesis undertakes some foundational discussions around a few key concepts, including *climate change*, *transboundary watercourse*, *transboundary river basin*, and *water treaties*. Part I further introduces the concepts of water cooperation and politics, to display the challenges posed by the Anthropocene on riparian States relation. Part II explores the theoretical and legal frameworks underpinning this thesis. Chapter 3 outlines the genesis and evolution of the legal frameworks that govern the transboundary water resources, whereas the doctrines, theories, and legal frameworks thereof are discussed in chapter 4. Under Part III, chapter 5 discusses the hydrography of the Congo River, while chapter 6 discusses the legal regime governing its transboundary waters. The understanding of the Congo River's hydrography

[63] See section 8.3 below for details on the Rhine River.

is a condition towards the building of an effective model of transboundary water governance across the basin. Part IV comprises chapters 7 and 8. Chapter 7 introduces *Cooley & Gleick's criteria framework* for treaty assessment regarding the integration of the climate change dimension. *Cooley & Gleick's criteria framework* will be referred to in chapter 8 for the assessment of the regime that governs the Congo River and its transboundary tributaries. Part V is comprised of chapters 9 and 10. Chapter 9 undertakes a comparative analysis between the regime that governs the waters of the Congo River and its transboundary tributaries and the regime that governs the waters of the Rhine River basin regarding the management of floods. Chapter 10 concludes this thesis, summarises its main outcomes, and formulates some recommendations on the basis of the thesis' findings.

2 KEY CONCEPTS OF THE STUDY

2.1 Introduction

The field of waters law has numerous traditional and emerging concepts, which environmental law scholars and practitioners are called to make regular use of. While some of these concepts are simply resurfacing, sometimes with new meanings, others are just making their entry in the jargon of international water law. This chapter briefly overviews some of these concepts, with a particular emphasis on the evolution that has led to reaching the current understanding thereof. The objective of this chapter is to provide an enhanced understanding of each of these concepts, including *climate change, river basin, and watercourse*. Concepts that are purely legal such as *treaties* or *Agreements* will be introduced by this chapter, but only briefly, as the second part of this thesis will be dedicated to them. Discussions regarding these concepts are crucial in a study that is focused on the legal implications of the impacts of climate change on transboundary water resources. However, as much as it will not be possible to review all these concepts, it will also not be helpful to discuss only superficially those that are the most pertinent to this thesis. The discussions in this chapter are arranged in four sections. The first section will provide an overview regarding the climate change science; it will discuss its discovery, definition, impacts, and the reasons for concern in the field of the law of transboundary water resources. The second section will be an attempt to inquire about the *river basin* concept, which is sometimes referred to as the *hydrographic basin*, or the *drainage basin*. The third section will discuss the *watercourse* concept, which is somewhat a novel concept in the jargon of international water law.

2.2 Climate change science

2.2.1 Background information

Climate change refers to changes in the climate system, which is generally defined as a highly complex system consisting of the atmosphere, the hydrosphere, the cryosphere, the lithosphere, the biosphere, and the interactions between them.[64] These changes add to the natural variability of climate and are attributed directly or indirectly to human activities.[65] A recent countries survey by the Pew Research Centre (PRC) has presented climate change as the most significant international threat facing the current epoch.[66] Half of the surveyed countries by the PRC (13 out of 26 countries) have reported global warming to be a top national security concern. Although scholars such as Baer & Singer [67] and some others established that the climate of the planet has never been static throughout history, scientists are convinced that the level, magnitude, and speed of the current changes have never happened before in the earth's climate history.[68]

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[64] See definitions of climate change in section 2.2.3 below.

[65] *Ibid*.

[66] The Pew Research Center (PRC) is an apolitical non-partisan think tank whose objective is to inform the public about attitudes, issues, and trends dominating the world. See for further details on the PRC: *https://www.pewresearch.org/about/*, accessed on 23 July 2019; For similar statements about climate change being the biggest threat of our time, see António Guterres 'Climate change is the biggest threat to global economy' (25 January 2019), available at *https://unfccc.int/news/antonio-guterres-climate-change-is-biggest-threat-to-global-economy*, accessed on 15 August 2019; A. Bannister 'Climate change dominates biggest global threats in 2019' (17 January 2019), available at *https://www.ifsecglobal.com/borders-infrastructure/climate-change-dominates-biggest-global-threats-2019/*, accessed on 15 August 2019; M. Nevitt 'We must think bigger and bolder about the national security threats posed by climate change' (2019), available at *https://www.justsecurity.org/63673/climate-change-our-greatest-national-security-threat/*, accessed on 15 August 2019.

[67] H.A. Baer & M. Singer *The anthropology of climate change: An integrated critical perspective*. (2018), 9; J.L. Blois *et al.* 'Climate change and the past, present, and future of biotic interactions' (2013) 6145 (341) *Science* 499, 499; G.C. Nanson *et al.* 'Wetting and drying of Australia over the past 300 ka' (1992) 9 (20) *Geol* 791, 791; G.M. Hallegraeff 'Ocean climate change, phytoplankton community responses, and harmful algal blooms: a formidable predictive challenge 1." (2010) 46 (2) *J of phycol* 220, 220.

[68] IPCC 2014 (d) *Climate Change: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Chang* (2014), 96 & 1257.

Overwhelming paleoclimatic evidence has suggested that more than once in the past, the planet already experienced episodes of critical climate change, which were characterised either by higher or by lower temperatures in comparison to the then averages.[69] Scientists claim that climate change has caused at different epochs in the past several disasters, species extinction, and civilizations collapse. It is even believed that species such as dinosaurs, now extinct, lived some sixty-five million years ago in a predominantly tropical planet, with palm trees growing in the Antarctica, and alligators swimming in Greenland. However, due to climate change, such paradises went eventually through complete upheavals, which even caused species disappearance.[70]

In their permanent quest for evolution and progress, human societies, which began some 12,000 years ago, evolved from small hunting and gathering groups to larger settlements in a geological context that was characterised by small climatic shifts at the global level,[71] which context the geologists refer to as the Holocene.[72] When viewed from this perspective, one can conclude, as did Bhandari,[73] that climate change science has "a relatively long history" with humans and their environment, even though there is no clarity on the exact time when the phenomenon was detected in the course of history.

Many scientists argue that climate change has played a significant role in the formation of human society. Baer[74] pushes his conclusions even further, admitting that climate change has always been a significant factor influencing all life on Earth, including human beings, their lifestyles, and behaviours, and in that sense, the phenomenon is also to

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[69] *Ibid.* Blois, at 499; *Ibid* Nanson at 791; *Ibid.* Hallegraeff at 220.

[70] Baer (note 67 above; 1-2).

[71] *Ibid*.

[72] The "Holocene Epoch" is sometimes referred to as the "Anthropocene Epoch". It is the current period in the geologic time. The Holocene/ Anthropocene begins 12,000 to 11,500 years ago at the decline of the Paleolithic Ice Age, and continues running down through today. Its anthropic reference comes from the fact that the primary characteristic of this epoch is the changes that were caused and are still being caused by human activities. Yet, the term can be misleading, because modern human establishments were already effective long before the Anthropocene epoch began; See for further details S.L. Lewis & A.M. Maslin 'Defining the anthropocene' (2015) 519 (7542) *Nature* 171, 171; See also M. Bagley 'Holocene Epoch: The Age of Man' available at *https://www.livescience.com/28219-holocene-epoch.html*, accessed on24 May 2019.

[73] M. P. Bhandari 'Climate change science: a historical outline' (2018) 1 (1) *Adv Agr Envir Sci* 5, 5.

[74] *Ibid*.

be looked at from a positive perspective. For scholars such as Yoffee and others,[75] the early civilizations were vulnerable to several constraints including short episodes of climate change, which led to their decline and collapse.[76]

2.2.2 A historical overview of the discovery of climate change

Varying opinions exist among scholars concerning climate change discovery and history. For Longwell,[77] it was the geological explorations that constituted the first steps towards climate change detection, whereas for Bhandari[78] it was through both geology and geography that the scientists began the exploration of climate variations and changes. Theses few opinions are all supportive of the fact that climate change as a phenomenon is not novel in the climatic history of the earth. However, as supported by the IPCC and numerous scholars,[79] what is indubitably new in the current episode of climate change is its anthropogenic dimension.

In the dawn of the 20th century, scientists from different fields set out to investigate the occurrence of the greenhouse phenomenon (GHG phenomenon). Their interest in this matter was fuelled by Arrhenius's discovery, a few years before, who discussed in a paper the influence of the atmospheric Carbon dioxide (CO_2) on the

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[75] L. Giosan *et al.* 'Fluvial landscapes of the Harappan civilization' (2012) 26 (109) *Proc of the Nat Acad of Sc.* 1688,1688; P.A. McAnany & N. Yoffee *Questioning collapse: human resilience, ecological vulnerability, and the aftermath of empire* (2009), 109.

[76] J.C. Woodward *et al.* 'Reach-scale river dynamics moderate the impact of rapid climate change on floodwater farming in the desert Nile' (2013) 41 (6) *Geology* 695, 698; T.R. Kidder *et al* 'The alluvial geo-archeology of the Sanyangzhuang site on the Yellow River floodplain, Henean province, China' (2012) 27 *Geoarchlogy* 324, 336.

[77] C.R. Longwell 'Origin of the word climate' (1954) 3113 (120) *Science* 355, 356.

[78] "Geology" means in Greek "the Earth and its speed". "Geography" is a composite word meaning "geo" for the earth, and "grapho" for "to write". The Greek noticed early the inclined position of the Earth and analysing its atmospheric variations through Geology and Geography. See for details Bhandari (note 73 above; 5).

[79] Baer (note 67 above; 1-2); A.B. Pittock '*Climate change: turning up the heat*' (2017), 2; The IPCC confirms with 95 percent of certainty that the current episode of climate change is human induced. See IPCC (2014) (e) *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the IPCC* (2014), v.

temperature of the Earth. Arrhenius[80] confirmed the existence of the *Green House Gas effect* and opened the way to further investigations. Before Arrhenius, Fourier[81] proposed in 1824, a theory according to which the gases present in the terrestrial atmosphere increased the temperature on its surface. There was also Tyndall[82] who argued that changes in the proportion of the atmospheric gases could play a significant role in the variation of the earth's climate.

A few decades after the works of Arrhenius and its predecessors, Keeling[83] began a systematic recording and analysis of the concentration of atmospheric CO_2 at the Mauna Loa Observatory, in the United States of America.[84] Keeling[85] published in 1960, his findings, which confirmed that the CO_2 atmospheric concentration was higher during the day than at night. He attributed this phenomenon to human activities, which are ordinarily intense in the daytime than at night. Keeling's discovery hence offered the necessary back up for the launching of the first global alert concerning the anthropogenic face of the observed global warming. Based on keeling's discovery, scientists pursued investigations on global warming. They eventually uncovered the existence of a more

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[80] For more details see D. Bodansky 'The history of the global climate change regime' (2001) *IRGCC* 23, 24; S. Arrhenius 'On the Influence of Carbonic Acid in the Air upon the Temperature of the Earth' (1897) 9 *Pub of the Astr Soc of the Pcfic* 9, 14.

[81] Arrhenius was not the first to have focused on this new phenomenon. Its predecessors include Fourier and Tyndall. Fourier's proposition is generally viewed as one of the first steps towards the discovery of the greenhouse effect. See J. Fourier 'Remarques Générales sur les Températures du Globe Terrestre Et des Espaces Planétaires' (1824) 27 *Annu de Chim et de Phys* 569, available at : *https://scienceblogs.com/stoat/2015/08/19/fourier-1827-memoire-sur-les-temperatures-du-globe-terrestre-et-des-espaces-planetaires*, accessed on 12 November 2018 ; C.D.Keeling 'The concentration and isotopic abundances of carbon dioxide in the atmosphere.' (1960) 2 (12) *Tellus* 200, 200, available at: *http://scrippsco2.ucsd.edu/assets/publications/keeling_tellus_1960.pdf*, accessed on 12 November 2018.

[82] J. Tyndall 'On the absorption and radiation of heat by gases and vapours, and on the physical connection of radiation, absorption, and conduction' (1861) 22 (4) *Phil. Mag Ser.* 169, 194.

[83] Keeling (note 81 above; 200).

[84] The Mauna Loa Observatory (MLO) is an atmospheric baseline station of the Earth System Research Laboratory (ESRL), Global Monitoring Division (GMD) of the National Oceanic and Atmospheric Administration (NOAA) of the USA. The MLO has been continuously monitoring and collecting data related to atmospheric change since the 1950's. Further details on the MLO at *https://www.esrl.noaa.gov*, accessed on 10 April 2019.

[85] Keeling (note 81 above; 200).

complex phenomenon, which was responsible for the changes they were observing in the earth's climate system, which complex phenomenon they called "climate change". [86]

2.2.3 Definitions

Two definitions are used to explain what the climate change is: the one is referred to as the "political definition", and the other is referred to as the "scientific definition", suggested by the IPCC,[87] and the "political definition", enshrined in Article 2 of the United Nations Framework Convention on Climate Change.[88] The UNFCCC (political definition) defines climate change as "A change of climate that is attributed directly or indirectly to human activities, which alters the composition of the global atmosphere, and adds to natural climate variability, observed over comparable time periods."[89] Whereas for the IPCC (scientific definition), climate change refers to "A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and which persist for an extended period, typically decades or longer."[90] References to climate change in this thesis will imply both definitions.

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[86] Besides the changes observed that led to the discovery of climate change, analysis of the global climatic data of the past 100 years clearly shows that there is a shift in the climate system. Between 1906 and 2005 for instance, the global mean temperature rose by some 0.74 degree Celsius. The same variable is predicted to rise by 1.4 to 5.8 degree Celsius between the years 1990 and 2100. See for details IPCC 2014 (d) (note 68 above; 96 & 1257).

[87] *Ibid*. IPCC 2014 (d) at 1255.

[88] The United Nations Framework Convention on Climate Change is discussed in detail in section 2.2.5.1 below.

[89] See Article 1. 2 of the UNFCCC; 'The atmosphere of the earth consists of some 78% of nitrogen (N2), 20% of oxygen (O2), and a mixture of small amounts of many other ingredients such as carbon dioxide (CO2), vapour of water (H2O), methane (CH4), sulphur dioxide (SO2), as well as carbon monoxide (CO). Information available at *http://www.windows2universe.org/earth/Atmosphere/chemical_composition.html&edu=high*. accessed on 24 October 2018); Climate variability refers to 'variations in the mean state and other statistics of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability)' See for details: IPCC 2014 (d) (note 68 above; 1257).

[90] The 2014 IPCC definition of climate change is the result of some adjustments made on the definition captured in the1992 IPCC first Assessment Report. Such adjustment of the Climate change definition by the IPCC became imperative as evidences that are more scientific came forward on the role played by

Scholars have often critically discussed these two definitions.[91] Gupta,[92] for instance, noticed the substantial differences that existed between the two definitions, which she found to have stemmed from an evolution of the climate change concept itself. Gupta[93] argues that the earlier approaches to climate change were more environment-centred, unlike the later approaches, which trend to includes some non-environmental considerations. The author further found that unlike the IPCC's definition, the UNFCCC's definition refrained from insisting on the natural causes of climate change in order to motivate the state's action. For her, states would have been less motivated for climate action if the political definition of climate change insisted on the natural origins of the phenomenon.[94]

2.2.4 Greenhouse gases emission, global warming, and climate change

In the space of two centuries, human activities have released around 566 billion metric tons of CO_2 into the atmosphere, causing a rise of the global mean temperature by some 0.74 degrees Celsius between 1906 and 2005.[95] CO_2 is the largest component of anthropogenic GHG emissions.[96] It is released during the combustion of fossil fuels such as coal, oil, and gas as well

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anthropogenic factors in provoking the contemporary climate change phenomenon. Unlike the IPCC definition, the UNFCCC definition has proven stable despite many waves of critics and calls for its amendment. It has remained unchanged.

[91] Pielke for instance noticed "serious inconsistencies" between the two definitions. See AR. Pielke 'Misdefining "climate change": consequences for science and action' *(*2005) 8 (6) *ES & P* 548 at 549; Hardy reported a selective use of the two definitions by scientists: the UNFCCC's definition was used when referring to the post-industrial era (after 1850), whereas the IPCC definition was used when referring to the pre-industrial era (before 1850). See JT. Hardy 'Climate change: Causes, Effects, and Solutions' (2003) *John Wiley & Sons* at 4.

[92] J. Gupta 'History of international climate change policy' (2010) 1 WCC 636 at 636-637.

[93] *Ibid.*

[94] For further comments on the two definitions of climate change, see: A. Kiss & D. Shelton *International Environmental Law* 3rd Ed (2004), 512.

[95] Baer (note 67 above; 1-2).

[96] The other GHG gas and their contribution to global warming include 1)The Methane (CH_4, 16 percent); 2) Nitrous Oxide (N_2O, 6 percent); 3) Per Fluorocarbons (PFCs) & Hydro Fluorocarbons (HFCs) (about 2 percent). It is because of such preponderance that scientists have adopted the carbon dioxide as the reference GHG, and the "Carbon Dioxide Equivalent Emission" (CO_2-eq) as the metric unit for GHG emissions measurements. See for details in IPCC 2014 (d) (note 68 above; 1257); NASA 'How is Today's Warming Different from the Past?' available at https://earthobservatory.nasa.gov/Features/GlobalWarming/page3.php, accessed on 5 April 2019.

as the production of cement.[97] CO_2 is not a climatic or an environmental pollutant as such; it accounts for approximately 76 percent of global warming. Other Key GHGs include Methane (CH_4), Nitrous Oxide (N_2O), and Hydro Fluorocarbons (HFCs).[98]

The global emission of GHG is still aggravating despite the introduction three decades ago of an international regime of CO_2 emission mitigation under the UNFCCC and its subsequent instruments.[99] As a result, climatic predictions announce further temperature rises ranging from 1.4 to 5.8 degrees Celsius to occur before the end of the current century.[100] Scientists lament that such level, magnitude, and speed of temperature rise have never happened before in the earth's climate history. [101] From being as little as 280 ppm in the period between 1750 and 1850, the CO_2 atmospheric concentration reached 400 ppm in 2010,[102] before crossing over that bar of 400 ppm three years later, in 2013, for the first time in millions of years.[103] More recently, in January 2019, the NOAA observatory reported a continual upward trend of the global atmospheric concentration of CO_2, which the source valued to some 409.92 ppm. For the IPCC, such speed of temperature rise is ten times higher than the average level of rising that occurred during the ice age.[104]

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[97] See for further details R. Houghton *et al* 'Carbon emissions from land use and land-cover change' (2012) 9 *Biogeosciences* 5125, 5126.

[98] *Ibid*. Houghton.

[99] Baer (note 67 above; 1-2).

[100] Baer (note 67 above; 1-2).

[101] IPCC 2014 (d) (note 68 above; 96 & 1257).

[102] T.M. Letcher *Climate change: observed impacts on planet Earth* (2015), xxiii; IPCC (2014) (e) (note 79 above; 39 – 54); The abbreviation "ppm" stands for "parts-per-million" (10^{-6}). The ppm provides quantity-per-quantity measures, and represents pure numbers with no associated units of measurement. See for more details: see Wikipedia 'Parts-per notation' available at *https://en.wikipedia.org/wiki/Parts-per_notation*, accessed on 22 June 2019.

[103] The date of May 9, 2013, became a landmark in the modern history of climate change. On that day, the NOAA observatory announced that the planet's concentration of CO_2 crossed over the bar of 400 ppm for the first time in Millions of years. Information available at *https://www.esrl.noaa.gov/gmd/about/aboutgmd.html*, accessed on 15 Mars 2019.

[104] IPCC 2014 (d) (note 68 above; 96 & 1257); NASA 'How is Today's Warming Different from the Past?' available at https://earthobservatory.nasa.gov/Features/GlobalWarming/page3.php, accessed on 5 April 2019.

If global warming and climate change are no longer debatable because of all the evidence outlined above,[105] there are still some political and scientific contradictions around both phenomena, mostly in the developed world, and the USA especially.[106] In this country, public debates on climate change are increasingly centred on the US government's contribution to the global financial mechanisms aimed at responding to climate change. Part of the US public opinion seem pessimistic on such contributions and fear for the impacts of the US National Determined Contributions (NDC) strategy on the USA's economy.[107] Also, there are still some American scientists that continue to give opposing views on the causes and origins of climate change despite that fact that with more than 99 percent of certainty, statistical analysis have halted any hypothesis of a natural cause of climate change,[108] and have confirmed with 95 percent of certainty the hypothesis of a human-induced phenomenon.[109] Yet, these scientists still advocate that the current episode of climate change has a natural rather that an anthropogenic origin.

2.2.5 Genesis and evolution of the institutional response to climate change

The Institutional responses to climate change refer to the legal and institutional mechanisms, which have been set up to organise the global, regional, or local responses to the threats of climate change. Prior understanding of climate change and its endorsement by states were the conditions before states involvement in the global response to the phenomenon. Three

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[105] For scientists consensus on climate change, see N. Oreskes 'The scientific consensus on climate change' (2004) 5702 (306) *Science* 1686, 1686; See generally A. Staudt *et al.* 'Understanding and Responding to Climate Change: Highlights of National Academies Reports' (2008).

[106] See generally A. Leiserowitz *et al. Climate change in the American Mind: Public support for climate & energy policies in March 2012* (2012).

[107] See L. Rajamani & J. Brunnée 'The Legality of Downgrading Nationally Determined Contributions under the Paris Agreement: Lessons from the US Disengagement' (2017) 29 (3) *J'l of Env L* 537, 538-540.

[108] Scientists continue claiming that the following factors as the possible causes of climate change: *i.* The atmospheric gases, *ii.* The variation of the earth's movement (the orbital induced climate change), *iii.* Volcanic activities; *iv.* The Atmospheric Aerosols; *v.* Agriculture; *vi.* Surface solar radiation; *vii.* Space weather and cosmic Ray effects. See for more details: R.P. Tuckett 'The Role of Atmospheric gases' in T.M. Letcher (ed.) *Climate change: observed impacts on planet Earth* (2015) 375, 375; See also IPCC 2014 (e) (note 79 above; v); McGill 'Is global warming just a giant natural fluctuation?' (April 2014) available at *https://www.mcgill.ca/newsroom/newsroom/node/20598*, accessed on 09 January 2019.

[109] *Ibid*. IPCC 2014 (e). *Ibid*. McGill.

Multilateral Agreements have been adopted and are regarded as the key instruments that define the current global regime to curb climate change. These instruments include the 1992 UNFCCC, the Kyoto Protocol, (its second commitment, which runs from January 1, 2013, until December 31, 2020), and at last, the 2015 Paris Agreement, adopted in December 2015.[110]

Firmer initiatives that led to the current climate change regime took place in the late 1980s and the early 1990s. Before that, there was the year 1972, which is regarded as a milestone year because of the organisation of the first United Nations World Conference on the Global Environment. It was this conference that gave birth to the United Nations Environment Program (UNEP)[111] and the 1972 Stockholm Principles on the human environment.[112]

The UNEP and the World Meteorological Organisation (WMO),[113] established the IPCC, in 1988, to provide governments at all levels with accurate scientific information that they are in need of to develop climate change-related laws and policies.[114] After its establishment, the IPCC played a significant role in the negotiations and adoption of the international climate change regime, mentioned earlier.

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[110] See section 2.2.5 below.

[111] The UNEP is the United Nations' leading global environmental authority, which sets the global environmental agenda within the UN system, and promotes a coherent implementation of the environmental dimension of sustainable development. UNEP's mission is to provide leadership to environment stakeholders and encourage partnership in caring for the environment, the inst alsoitution serves as an authoritative advocate for the global environment. See for more details*: https://www.unenvironment.org/about-un-environment*, accessed on 09 January 2019.

[112] The United Nations Conference on the Human Environment took place in Stockholm, Sweden, from 5 to 16 June 1972. The aim of the conference was to consider the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment. The key outcome of the conference was the Stockholm Declaration, which is a set of 26 environmental Principles. The Stockholm Conference report of 1972, available at *http://www.un-documents.net/aconf48-14r1.pdf*, accessed on 10 April 2019; See Bodansky (note 80 above; 23).

[113] The World Meteorological Organisation [Hereinafter WMO] is a specialised agency of the UN, with 192 member states and territories. It is the authoritative voice of the UN system on the state and behaviour of the Earth's atmosphere, its interactions with lands and oceans, the weather and climate, and the distribution of water resources that follows. Information available at *https://public.wmo.int/en*, accessed on 2 May 2019.

[114] See note 3 above for details on the IPCC.

Three contributions are regarded as "major", in the sense that they have been highly influential towards the formation of the international institutional response to climate change. These are *first*, the discovery of the stratospheric "Ozone hole" in 1987, and the legal regime that followed in response to the phenomenon.[115] *Second*, the release of the Brundtland Commission report in 1987 under the title "*Our Common Future"*.[116] *Third*, the early enough UN Resolution 43/53 recognizing in 1988, climate change as a "common concern to the mankind". The regime instituted by the 1985 Vienna Convention and its 1987 Montreal Protocol to phase out the Ozone-depleting substances that caused the "Ozone hole" played a significant referral role during the drafting of the UNFCCC.[117] The 1987 Brundtland Commission report inspired the organisation of the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, which produced the 1992 UNFCCC and the 1992 Convention on Biological Diversity (CBD).[118] By recognizing climate change as a "common concern of mankind", the UN Resolution 43/53 put the climate change early enough on a high profile agenda at the global level,[119] which

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[115] The *Ozone hole* is "a severe depletion of stratospheric ozone in late winter and early spring in the Antarctic". See D.W. Fahey *et al.* 'Twenty Questions and Answers about the Ozone Layer 2010 Update: Scientific Assessment of Ozone Depletion 2010' (2011) *WMO*, 27.

[116] Report available at *http://netzwerk-n.org/wp-content/uploads/2017/04/0_Brundtland_Report-1987-Our_Common_Future.pdf* , accessed on 18 March 2019; Bodansky (note 80 above; 23).

[117] "The 1985 Vienna Convention for the Protection of the Ozone Layer [Hereinafter the 1985 Vienna Convention] was adopted in 1985, on the 22nd of March. It entered into force on September 22, 1988. Its objectives is to promote cooperation by means of systematic observations, research and information exchange on the effects of anthropogenic activities on the ozone layer, and to adopt corrective legislative or administrative measures. In 2009, the 1985 Vienna Convention became the first convention to achieve universal ratification, with 197 countries parties. The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer [Hereinafter the 1987 Montreal Protocol] implements the 1985 Vienna Convention. Its mandate is the phasing out of some conventionally identified ozone depleting substances. The regime established by the 1985 Vienna Convention and its Protocol stands as one of the most successful examples of international cooperation to tackle a major global environmental threat. Further information on both treaties are available at *http://ozone.unep.org/en/treaties-and-decisions/vienna-convention-protection-ozone-layer*, accessed on 11 April 2019.

[118] The Conference was held from 3 – 14 June 1992 under the aegis of the UN. Report on the conference available at *http://www.un.org/geninfo/bp/enviro.html*, accessed on 16 July 2019.

[119] 'The 70th plenary meeting of the UN General Assembly of the 6th December 1988, entitled "Protection of global climate for present and future generations of mankind" declares: "… Recalling also the conclusions of the meeting held at Villach, Austria, in 1985, which, inter alia, recommended a programme on climate change

highly contributed towards the organisation and coordination of an international response to the phenomenon.

2.2.5.1 The United Nation Framework Convention on Climate Change Regime of 1992

The United Nations Framework Convention on Climate Change (UNFCCC) is the primary framework convention that organises the climate change response at the global level. It was adopted in May 1992, in Rio de Janeiro, Brazil, to enable countries to cooperatively design and implement actions to curb global warming and avoid further negative impacts of the phenomenon on the planet and its inhabitants.[120] The Convention entered into force on the 21st of March 1994, with universal support, as reflected by its 197 states ratification. Such universal support constituted a good signal about the trust country parties put in the Convention's goal. It also suggested that countries found necessary to have in place a mechanism of coordination of a global response to climate change. Article 2 of the UNFCCC provides:

> "The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties (COP) may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame that is sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."[121]

In response to climate change, the UNFCCC adopted two sets of critical measures, which are the mitigation and adaptation measures. The "Mitigation measures"

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to be promoted by governments and the scientific community with the collaboration of the WMO, the UNEP, and the ICSU, convinced that climate change affects humanity as a whole and should be confronted within a global framework so as to take into account the vital interests of all mankind, 1. Recognizes that climate change is a common concern for mankind, since climate is an essential condition which sustains life on earth". See UNGA Resolution 43/53 A/RES/43/53, 6 December 1988, United Nations Organisation. Available at *http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/43/53*, accessed on 10 February 2019.

[120] Information available at *https://unfccc.int/about-us/about-the-secretariat* , accessed on 20 April 2018.

[121] Article 2 of the UNFCCC.

broadly refer to human interventions to reduce the sources of GHGs, or enhance the sinks thereof, whereas the "adaptation measures" roughly refer to changes in processes, practices, and structures to moderate the potential damages or to benefit from opportunities that are associated with climate change.[122]

Based on the Common but Differentiated Responsibility Principle,[123] the UNFCCC has created a differentiated regime of general commitments and specific commitments for the reduction of the emissions of GHGs. Under the UNFCCC, developed countries, which are mainly the countries members of the OECD, are identified as Annex 1 countries,[124] along with the states of the former Eastern Europe bloc. The rest of the countries are regarded under the Convention as developing countries. The convention's general commitments are enshrined in its Articles 4 (1), 5, 6, and 12 (1). They are mainly qualitative, and apply to all the parties, despite some nuances depending on whether a country is a developed or a developing one.[125] Specific commitments are enshrined in Articles 4 (2), 4 (3), and 12 (2), and apply only to developed countries. They address issues of the sources and sinks of the GHG, technology transfer from the developed countries to the developing ones, and also issues relating to the finances needed to organise the global riposte to climate change.

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[122] IPCC (2014) (e) (note 79 above; 117, 118 & 125).

[123] The Common but Differentiated Responsibility Principle [hereinafter CBDR] is one of the major concept of the international climate change regime. It can be described as a way of dissecting the proportional obligations that countries have vis a vis the planet's, in all justness and fairness. See further details in K.L. Mbeva & P. Pauw 'Self-Differentiation of Countries' Responsibilities Addressing Climate Change through Intended Nationally Determined Contributions' (April 2016) Discussion Paper *Deut Inst für Entw*, 5.

[124] 'The Organisation for Economic Co-operation and Development (OECD) was established on December 14, 1960. Nevertheless, it became operational on 30 September 1961, when its establishing convention entered into force. The OECD has 35 member countries worldwide. They regularly turn to one another to identify discuss and analyse problems, and discuss and promote policies that may be put in place to solve them' Information available at *http://www.oecd.org/about/history/*, accessed on 09 August 2019. The preamble of the UNFCCC states: "Noting that the largest share of historical and current global emissions of GHG has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs."

[125] See Articles 4 (1), 5, 6, and 12 (1) of the UNFCCC.

In December 1997, five years after the adoption of the UNFCCC, the Kyoto Protocol to the UNFCCC was adopted, under which developed countries were committed to reducing their GHG emissions "by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012".[126] With its system of emissions limitations, the Kyoto Protocol was the first comprehensive international agreement that was aimed at reducing greenhouse gases globally. The Kyoto Protocol had two commitment periods: a first one, which runs from 1 January 2008 to 31 December 2012, and a second one, which has been running from 1 January 2013 and will expire on 31 December 2020.[127]

Despite all the above instruments and strategies, global emissions continued to grow dangerously.[128] This situation eventually brought back a long-standing question of whether binding emission limitations should be extended to developing countries as well.[129] In the meantime, increasing voices arose against the UNFCCC, advocating for a regime replacement.[130] For these observers that raised their voices, the failure of the UNFCCC regime was the consequence of its lack of "specific emission reductions measures". It was in such a context of crisis that the "unsuccessful" COP15 was held in Copenhagen, Denmark.[131] Initially set up to "save the planet", the Danish COP failed to deliver what it

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[126] Article 3 (1) of the Kyoto Protocol.

[127] Information available at *http://unfccc.int/kyoto_protocol/items/2830.php*, accessed on 10 May 2019.

[128] A. Manne & R. Richels 'US rejection of the Kyoto Protocol: the impact on compliance costs and CO_2 emissions' (2004) 32 (4) *Ener Pol* 447, 451.

[129] D. Bodansky 'The Paris climate change agreement: a new hope?' (2016) 110 (2) *Amer J of Int L* 288, 302-302; O. Widerberg & P. Pattberg 'International cooperative initiatives in global climate governance: Raising the ambition level or delegitimizing the UNFCCC?' (2015) 1 (6) *Glob Poli 45*, 46; S. Barrett 'Climate treaties and the imperative enforcement. (2008) 24 *Oxf Rev Econ Pol* 239, 258; R. Magnusson *et al.* 'The Kyoto Protocol: implications of a flawed but important environmental policy' (2000) *Can Pub Pol/Anal de Pol* 347, 347-348; H. Winkler 'Measurable, reportable and verifiable: the keys to mitigation in the Copenhagen deal' (2008) 8 *Clim Pol* 534, 534-536.

[130] IISD 'Summary of the Copenhagen Climate Change Conference: 7-19 December 2009' (2009) 12 (459) *Earth Negotiations Bulletin* 2, 1; Engel & H. Kirsten 'Mitigating global climate change in the United States: a regional approach' (2005) 14 *NYU Envtl. LJ* 54.

[131] Widerberg & Pattberg (note 129 above; 46); See T. Hale 'How the UNFCCC Can drive climate ambition in advance of a treaty: record, review, reinforce, recruit' (2013); D. Bodansky 'The international climate change regime: The road from Copenhagen' (2010) *Viewpoints Series;* C. Bhushan 'After 25 years of failure, we should

promised, evidencing through that a deep crisis in the multilateral climate change governance. However, COP15 paused the basis for a new climate change regime, intending to limit the increase of the global temperature to 2 Celsius degrees, and that would apply to all parties to the UNFCCC.[132]

2.2.5.2 The 2015 Paris Agreement: Ambitions, hopes, disappointments, and fears

The Paris Agreement came as an answer to the voices against the regime of the UNFCCC. It was adopted on December 12, 2015, during the 21st Conference of the Parties to the UNFCCC,[133] which was held in Paris, France. The Paris Agreement entered into force on November 4, 2016.[134] Many viewed COP 21 as the most successful climate change conference in history.[135] One hundred ninety-five country parties to the UNFCCC gathered with the intention to adopt either a "protocol, another legal instrument or an agreed outcome with legal force under the UNFCCC which applied to all parties." an objective consecrated by the Durban Platform for Enhanced Action, in 2011.[136]

Article 2.a. of the Paris Agreement has set a target of limiting the global temperature increase to "well below 2 degrees Celsius above pre-industrial levels" but encourages the state members to pursue efforts to stay below 1.5 degrees Celsius of

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abandon the UNFCCC' (March 2019), available at *https://www.climatechangenews.com/2019/03/27/25-years-failure-abandon-unfccc/* , accessed on 01 Mars 2019.

[132] R. Knutti *et al.* 'A scientific critique of the two-degree climate change target' (2016) 9 (1) *Nat Geosc* 13, 13.

[133] The Conference of Parties [COP] also known as COP, is the decision-making entity, which is responsible for the monitoring and the review of the implementation of several United Nations Convention, including the United Nations Framework Convention on Climate Change. Article 7 of the UNFCCC provides with more details about the institutional mechanism of the UNFCCC COPs.

[134] Information available at *http://unfccc.int/focus/ndc_registry/items/9433.php*, accessed on 10 February 2019.

[135] F. Harvey 'Paris climate change agreement: the world's greatest diplomatic success', available at *https://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-cop-diplomacy-developing-united-nations*, accessed on01 Mars 2019; C.G. Dure 'Paris Agreement: Success or Failure, and What Next?' *available at http://climatica.org.uk/paris-agreement-success-failure-next*, accessed on 01 Mars 2019.

[136] Decision 1/CP.17 of the UNFCCC COP 17 instituted the Durban Platform for Enhanced Action, with a mandate to "develop another legal instrument or an agreed outcome with legal force under the Convention which would be applicable to all parties. The Durban Platform offered the indicated platform for the negotiation of the Paris Agreement. Information available at *https://unfccc.int/adp-bodies-page*, accessed on 5 February 2019.

temperature increase at the end of the current century.[137] To reach such an ambitious target, the treaty has established a set of binding commitment to all its state parties to undertake as ambitiously as possible domestic emission reduction efforts under countries' National Determined Contributions.[138] However, there seems to be no significant progress regarding GHG emission reduction at the global level. Recent compilations made by different observers reveal that the world is globally in a dangerous track of going beyond 3.3°C by the end of the current century.[139]

Even if fully implemented, the current emissions reduction targets, as reflected in the aggregation of all the NDCs, are still likely to lead the world to a 3.3 Celsius degree of additional temperature by 2100.[140] Scholars such as Bodansky[141] and Bodle[142] to mention only these foresaw in the non-binding character of the Paris emissions reduction scheme a significant shortcoming, which could lead to the failure of the Paris' regime.

In 2018, the IPCC issued a further warning to states regarding the devastating consequences of the continual increase of anthropogenic GHG emissions worldwide.[143] What seems even more of concern is the low level of ambition of the global NDC. Even if the

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[137] See Article 2 of the 2015 Paris Agreement.

[138] Article 3 of the 2015 Paris Agreement provides: "As National Determined Contributions [NDC] to the global response to climate change, all parties are to undertake and communicate ambitious efforts as defined in Articles 4, 7, 9, 10, 11 and 13 with the view of achieving the purpose of this agreement as set out in Article 2. The efforts of all parties will represent a progression over time, while recognising the need to support developing country parties for the effective implementation of this Agreement" more details on NDC available at *https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs*, accessed on 22 February 2019.

[139] IPCC (2014) (f) (note 7 above); Information available at *https://climateactiontracker.org/*, accessed on 22 February 2019; The Climate Action Trackers is an independent body of three research organisations created in 2009. It has specialised in tracking the global climate action, especially the progress towards the objective of holding global warming well below 2°C, and further pursuing efforts to limit it to 1.5°C.

[140] UNEP (c) *The Emissions Gap Report* (2018), 21; See M. Rocha *et al. Paris Agreement in force, but no increase in climate action* (2016), 1-2.

[141] Bodansky (note 129 above; 301).

[142] R. Bodle *et al.* 'The Paris Agreement: Analysis, Assessment and Outlook' (2016) *CCLR*, 8.

[143] IPCC (2018) (f) (note 7 above).

chances of such a call to be followed seem very narrow, calls are being made for more ambitious NDC, and for a decarbonised world in the middle of the current century.[144]

2.2.6 The climate change and water nexus

The above picture opened the way to discussions on the impact of climate change on freshwaters. McCaffrey[145] has given a wonderful summary of the contemporary issue associated with water resources: finite supply, but growing demand. Found in the biosphere, the geosphere, and the atmosphere, water is a vital resource provided by Mother Nature. Water is generally defined as "a colourless, transparent, tasteless, scentless compound of oxygen and hydrogen, in a liquid state, convertible by heat into steam and by cold into ice."[146] At no time in human history, have the importance and centrality of water resources in lives and societies ever been questioned.[147] Without water, neither life nor human activities are conceivable. Water enters the biological composition of all the living beings, in both the vegetal and animal reigns. A human being, for instance, is made of 65 percent of water as an adult against 97 percent while fetus, whereas animals are made of it for 65 to 95 percent, and plants between 78 to 95 percent.[148]

There is a large consensus among scientists on the fact that water is the primary channel through which climate change is influencing the Earth's ecosystems, livelihood and welfare.[149] As mentioned earlier, climatic predictions state that by the year

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[144] See generally M. Fay *et al. Decarbonizing development: Three steps to a zero-carbon future* (2015); UNEP (c) (note 140 above).

[145] S.C. McCaffrey (a) *The law of international watercourses* 2nd Ed. (2007), 2; For the UN, water is the most basic and essential natural resource on the planet, see FAO 'Water – the most basic resource but also the most essential' (2014), available at *http://www.fao.org/zhc/detail-events/en/c/231215/*, accessed on 22 April 2019.

[146] available at *https://www.merriamwebster.com/dictionary/pdf*, accessed on 19 October 2018.

[147] D.A. Caponera & M. Nanni (c) *Principles of water law and administration: national and international* 3 ed. (2019), 1-2; G. Van Den Velde *et al.* 'Living rivers: Trends and challenges in science and management' (2006) 565 (1) *Hydrobiologia* 359, 360; UNEP (a) (note 12 above; 1).

[148] A.M. Helmenstine 'How Much of Your Body is Water', available at *https://www.thoughtco.com/how-much-of-your-body-is-water-609406*, accessed on 22 April 2019.

[149] UN-Water *Climate change adaptation: The pivotal role of water* (2010), 2-3; E. Ansink & A. Ruijus 'climate change and the stability of water allocation agreements' (2008) 2 (41) *Env'l & Res Econ* 249, 250; SEG-CC *Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable* (2007), v, avaialble

2025, the current figure of 700 million people living worldwide below the water stress threshold of 1,700 cubic meters per person per year, will rise to approximately 3 billion souls because of climate change.[150] It is further predicted that 7 percent of the global population will be exposed to a drop of more than 20 percent of their available water resources as a result of every additional degree of the global temperature.[151]

In a recent assessment of the risks and hazards associated with worlds that are 1.5 and 2 degrees Celsius warmer than the pre-industrial era, Döll[152] concluded that significantly wetter or drier conditions are smaller in a 1.5 Celsius degree world than in a 2 Celsius degree world. Suggesting as also did O'Neill[153] that there would be more water vulnerability in a warmer world. The global climate system is a highly complex and interactive thing, which comprises all sorts of elements, including waters, snow and ices, lands, and all sorts of living things that are therein.[154] What happens to the global climate influences each one of these elements and the living things that are therein;[155] that is the reason why water resources are highly dependent on the global climate system and vulnerable to climate change.[156]

The IPCC has developed a "climate change and reasons for concern" framework, to inform discussions that aim at implementing the long-term objective of the

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at *http://www.globalproblems-globalsolutions-files.org/unf_website/PDF/climate%20_change_avoid_unmanagable_manage_unavoidable.pdf* ; Gleick P.H. *Water: the potential consequences of climate variability and change for the water resources of the United States* (2000); Jiménez *et al.* (note 5 above; 233).

[150] UNDP (a) *Human Development Report 2006. Beyond Scarcity: Power, Poverty and the Global Water Crisis* (2006), 14; IPCC (2014) (e) (note 79 above; 39 – 54).

[151] Arjoon *et al.* (note 9 above; 2136); Sanchez & Roberts (note 9 above; XV); Jiménez *et al.* (note 5 above; 232).

[152] P. Döll *et al.* 'Risks for the global freshwater system at 1.5 C and 2 C global warming' (2018) 4 (13) *Env Res Let 044038*, 9-10.

[153] B. C. O'Neill *et al.* 'IPCC reasons for concern regarding climate change risks' (2017) 1 (7) *Nat Clm Ch*, 31.

[154] Bhandari (note 73 above; 6).

[155] F. Ludwig *et al.* 'Perspectives on Climate Change Impacts and Water Security' in C. Pahl-Wostl *et al.* (eds.) *Handbook on water security* (2016) 139, 139-140.

[156] Blumstein (note 30 above; 2).

UNFCCC as mentioned earlier.[157] A closer look at these "reasons for concern" shows that they all relate to water resources in one way or the other. Almost all of the climate change extreme events are conveyed through water resources. That is why, any disruption of the earth's climate system results in increased frequency and intensity of those extreme events, with all the associated negative impacts.

Most of the above figures are evidence of the quantitative impact of climate change on water resources. However, climate change causes also negative impacts on water quality. For Bruch,[158] it is more likely that many countries will start facing water quality problems long before they begin experiencing significant water availability issues. Some studies have demonstrated the water pollution from sewage, industrial chemicals, wastes, urban runoff, agricultural fertilisers, and pesticides, to name but a few will become more intense under climate change.[159] In a growing number of contexts, the overdrawing of water resources contributes also to water quality concerns.[160]

2.3 The River Basin

2.3.1 Background information

Intense debates took place about the use or not of the *River basin* concept during the lengthy rounds of negotiations of the 1997 United Nations Convention on the Non-navigational uses of International Watercourses (1997 UNWCC). The negotiations took place under the International Law Commission[161] and the Sixth Committee of the UN General

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[157] The IPCC reasons for concern regarding climate change include: *i.* unique and threatened ecosystems and species; *ii.* the increase in the frequency and damage from extreme weather events; *iii.* the greater climate change vulnerability of homes of poorer communities; *iv.* the growing economic costs caused by the impacts acquired over time by increased atmospheric concentrations GHG; and *v.* the growing possibility of the occurrence of large scale singular events. See the IPCC (2014) (e) (note 79 above; 2170).

[158] *Ibid.*

[159] *Ibid.*

[160] *Ibid.*

[161] The International Law Commission [Hereinafter ILC] is a body of experts established in 1947 by the United Nations General Assembly [hereinafter UNGAS] under Article 13 (1) (*a*) of the Charter of the United Nations to "initiate studies and make recommendations for the purpose of ... encouraging the progressive development of international law and its codification". Details on the ILC at *http://legal.un.org/ilc/*, accessed on 10 May 2019.

Assembly.[162] States' mistrust vis-à-vis the *river basin* concept was so strong that the 1997 UNWCC refrained from making any reference to it.[163] However, as argued by Alcega,[164] the adoption of the 1997 UNWCC was not the abolition of the river basin concept. Some water treaties signed after 1997 referred to the river basin concept, sometimes as the core concept of the treaty, thus confirming the resilience and the capacity of adaptation of the concept mentioned by Teclaff. [165]

2.3.2 Defining "river basin" and "international river basin"

The *river basin* is an old concept, which sometimes is referred to as the *hydrographic basin*, the *drainage basin*, or even the *catchment area*.[166] Under Article 2.13 of the European Union Water Framework Directive of 2000, a river basin is defined as: "The area of land from which all surface run-off flows through a sequence of streams, rivers, and, possibly, lakes into the sea at a single river mouth, estuary or delta."[167]A river basin becomes

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[162] The Sixth Committee of the UNGAS is the primary platform for the consideration of legal matters in the General Assembly. All the country members of the United Nations Organisation are entitled to representation in the Sixth Committee. Further details available at *https://www.un.org/en/ga/sixth/*, accessed on 22 July 2019; See S.S. Alcega 'The Hydrographic Basin in the Convention on the Law of non-navigational Uses of International Watercourses, 21 May 1997', available at *http://www.forumfed.org/library/the-hydrographic-basin-in-the-convention-on-the-law-of-non-navigational-uses-of-international-watercourses-21-may-1997/*, accessed on 12 June 2019.

[163] See section 4.4 below for further details on the 1997 UNWCC.

[164] Alcega (note 162 above).

[165] The example of treaties that were signed after the year 1997, but still made reference to the river basin concept are *i.* the Protocol on Shared Watercourses in the SADC (Article 7), which was concluded on August 7, 2000, three years after the adoption of the 1997 UNWC, and *ii.* the SADC Revised Protocol of 2005, whose Article 3 (8) (a) made also reference to the river basin concept. This Article provides : "Utilisation of a shared watercourse in an equitable and reasonable manner within the meaning of Article 7(a) and (b) requires taking into account all relevant factors and circumstances including: (i) geographical, hydrographical, hydrological, climatic, ecological and other factors of a natural character; (ii) the social, economic and environmental needs"; L.A. Teclaff (d) 'The river basin concept and global climate change' (1990) 8 *Pace Envtl L Rev* 355, 361.

[166] A "drainage basin" is bounded by watersheds which drain into a river, a basin, or a reservoir. A "drainage basin" is synonymous to "catchment area" and to "drainage area". Information available at *https://www.dictionary.com/browse/drainage-basin*, accessed on 20 May 2019.

[167] The European Union (EU) is a political and economic union, which comprises 28 member states that are primarily located in Europe. See for further details: *https://europa.eu/european-union/about-eu_en* , accessed on 10 August 2019. See Article 2.13 of the European Union Water Framework Directive of the year 2000.

"international" or "transboundary" when its boundaries intersect with the boundaries of at least two states.[168]

The French geographer Buach[169] became in 1752 the first scientist to have attempted to define what a "river basin" is. For Buach,[170] river basin was "the set of all the slopes on which falls the waters that converge to the same river or creek". Although Buach's definition is outdated and distant from the contemporary meaning of the concept, it nevertheless made a significant contribution on the road to its understanding. Buach's definition also threw light on the evolving character of the content of the river basin concept. After Buach's effort, several other contributors attempted to define the river basin concept from different perspectives.[171] For Sadoff,[172] for instance, the concept of *river basin* applies to both the land area from which all surface run-off flows and to the flowing waters. Sadoff's definition is close to that of the European Union.

2.3.3 Genesis and evolution of the river basin concept

2.3.3.1 The genesis of the concept

Establishing a precise date or epoch for the birth of the River Basin concept seems unclear. Nevertheless, historical records put the first attempts to formally use the river basin concept only at the epochs when humans began (*i)* navigating along watercourses, (*ii*) controlling flood activities, and (*iii*) practising irrigation.[173] History has confirmed the existence of

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[168] See McCaffrey (a) (note 145 above; 41).

[169] F. Molle (b) *Planning and managing water resources at the river-basin level: Emergence and evolution of a concept.* vol. 16 (2006), 3.

[170] *Ibid*.

[171] See more discussions on river basins in A.K. Biswas 'Management of transboundary waters: an overview' in *Management of transboundary rivers and lakes* (2008) 1, 7; See A.T. Wolf *et al.* 'International river basins of the world' (1999) 4 (15) *Int J of Wat Res Devpmt* 387, 389; N.P. Gleditsch *et al. 'Conflicts over Shared Rivers: Resource Wars or Fuzzy Boundaries?'* (2004) working Paper, 4; Article 3.5 of the 2004 Berlin Rules on water resources defines a "drainage basin" as "an area determined by the geographic limits of a system of interconnected waters, the surface waters of which normally share a common terminus."

[172] For Sadoff, the term "International River basin" generally refers to "surface flows, groundwater, rainfall and soil moisture within a watershed." By this definition, Sadoff equated river basin with the waters they contain, which is somewhat erroneous. See Sadoff *et al. Share – Managing water across boundaries* (2008), 15.

[173] *Ibid*. Sadoff; For more details about the historical evolution of the concept, see Molle (b) (note 169 above).

practices that testifies about people's early awareness regarding the existence of river basins.[174] Records signal concept use for times as far as during the hydraulic civilisations.[175] The pressing necessity to exercise control over water resources, which characterised ancient societies led them to discover the extent of the water system that they were part of. Hydraulic civilisations also developed water cooperation, but in struggles, because of the frequent attempts of political expansionism that were expressed by some kingdoms and empires. The political expansionism of the early epoch was often motivated by the desire to exercise supreme control over shared water resources.[176]

Early civilisations, or, as Wittfogel[177] referred to them, the 'hydraulic civilisations' began at locations where water was of easy access. They developed sophisticated means of data collection over water resources, and had basin-wide managerial practices and cooperation, proving their awareness of the interdependence of water systems.[178] This is why Teclaff, [179] was convinced that human understood and took into consideration the functional unity of the river basin long enough before they even reached as such a better understanding of the river basin concept. This legacy of understanding the interdependence of water systems has been passed on to future generations. That is why in several parts of the world, political institutions which developed in the course of history, took into consideration the functional unity of river basins.

With the understanding of the interdependence of water systems came the rise of consciousness on the existence of a community of interests on the shared water resources, which is regarded as the next step towards the development of the river Basin

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[174] L.A. Teclaff (e) 'Evolution of the river basin concept in national and international water law' (1996) 36 *Nat. Res J 359,* 361.

[175] *Ibid*.

[176] *Ibid*.

[177] K.A.Wittfogel 'Oriental despotism: A study of total power' (1957) *N Hav YUniv Pr*, 401; Storozum *et al.* are opposed to the qualifier of the "early civilisations" to be "hydrolic Civilisations" as initially proposed by Wittfogel. See for more details: "Early civilisations M. Storozum *et al.* 'Early evidence of irrigation technology in the North China Plain: geoarchaeological investigations at the Anshang site, Neihuang County, Henan Province, China' (2018) 2 (33) *Geoarch* 33 143, 143-161.

[178] Activities such as navigation, flood control, irrigation, trade, to name but a few, all made river co-users living upstream or downstream, to progressively discover each other; Molle (b) (note 169 above; 1).

[179] Teclaff (d) (note 165 above; 4).

concept.[180] The rise of consciousness opened the way to various forms of relationship and cooperation around shared water resources,[181] consolidated the recognition of the hydrographic unity of river basins, and contributed to the birth of the river basin concept.[182] For Teclaff,[183] such consciousness has ultimately led to the formation of the two modern central systems of water law: the domestic water law, and the transboundary water law.[184]

2.3.3.2 The evolution of the concept before the 1911 Madrid Declaration

One of the things that helped consolidate the river basin concept in the contemporary epoch is the 1911 Madrid Declaration released in Madrid, in Spain, on April 20, 1911, by the Institute of International Law.[185] The 1911 Madrid Declaration was an interim normative instrument, which aimed at filling a gap in the international law regarding the regulation of the use of international watercourses for purposes other than navigation. It raised the concept of the river basin to the level of a central operational concept in the field of international water management.[186] The 1911 Madrid Declaration states:

> "Riparian States with a common stream are in a position of permanent physical dependence on each other which precludes the idea of the complete autonomy of each State in the section of the natural watercourse under its sovereignty." [187]

From the antiquity down to the middle of the nineteenth century, scientific knowledge on water developed considerably.[188] Some of the modern States which formed progressively during the middle age showed support to the river basin concept. The rivers of Europe supported intensely the blooming industrial development of the middle of the nineteenth century.

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[180] Ibid. at 359.

[181] *Ibid*. Tvedt *et al.;* Trade relations for instance begun then.

[182] *Ibid*. Tvedt *et al.*

[183] *Ibid*.

[184] *Ibid*.; Tvedt *et al. A History of Water: Sovereignty and international water law* (2015), 212.

[185] *Ibid*.; Declaration of Madrid of April 20, 1911, available at *http://www.idi-iil.org/en/sessions/madrid-1911/?post_type=publication*, accessed on 21 January 2019.

[186] Molle (b) (note 169 above; 1).

[187] Paragraph 1 of the Declaration of Madrid of April 20, 1911".

[188] Molle (b) (note 169 above; 4).

Because of that, the river basin concept was granted a high political recognition, to the extent of receiving an institutional consecration. The French government, for instance, proposed in 1851, a plan to regroup the country's departments in 22 regions, with the boundaries of the departments matching geographically those of the river basins in which it laid.[189] In England, the whole country was divided into drainage districts by legislation in 1930.[190] In Germany, the government adopted the river basin concept and instituted a unitary approach for the management of the Ruhr River basin to stop the rise of industrial-born water pollutions. [191] The USA conservationist movement showed themselves very vocal on the unitary character of river basins, and supported the concept mainly for environmental purposes.[192]

Despite all the support given to the concept, the communities of riparian states continued using transboundary water resources without putting in place the relevant legal rules to that end. Perhaps, as argues Teclaff,[193] states did not yet see issues concerning the non-navigational uses of the shared watercourses, as it is the case currently.

From the time the Madrid Declaration was issued, the river basin concept started benefiting from a broad recognition by states who generally recognised it as a unit for water operations and decisions.[194] Molle[195] noticed that after the 1911 Madrid Declaration, activities such as water supply, hydroelectricity generation, irrigation and flood control were the first to come to minds while thinking about river basins. River basins were seen as the indicated platforms whereby to discuss the design and application of the

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[189] *Ibid*.

[190] See the England Land Drainage Act of 1930. Available at *https://api.parliament.uk/historic-hansard/acts/land-drainage-act-1930*, accessed on 5 July 2019.

[191] OAS *Environmental Quality and River Basin Development: A Model for Integrated Analysis and Planning* (1978). Online report available at *https://www.oas.org/dsd/publications/Unit/oea71e/ch02.htm#i.%20introduction* , accessed on 12 May 2019.

[192] *Ibid*.

[193] Teclaff (d) (note 165 above; 363).

[194] Molle (b) (note 169 above; 4).

[195] *Ibid*.

laws and politics of natural resources and ecosystems protection, with diverging views, in passing hitting each other, in search for optimality.[196]

2.3.3.3 The period after the 1911 Madrid Declaration in western countries

A few decades after the 1911 Madrid Declaration, the river basin concept went through a short crisis of recognition, as many western countries temporarily refrained from supporting the concept.[197] It was only later that states decided to resume their support to the concept.[198] States did so through the rise of the movement of basin-wide development projects.[199]

The US government established the Tennessee Valley Authority (TVA) in 1933. The TVA pioneered the establishment of river basin authorities worldwide.[200] The TVA was conferred with authority to achieve a comprehensive and regional socio-economic development, which would be centred on the Tennessee River basin. The TVA was a USA domestic institution. However, its creation marked the birth of the concept of autonomous basin-wide entities, primarily referred to as "valley authorities". After the experience of the TVA, the US federal government signed the Water Resources Planning Act, in 1965 under which it instituted other river basin commissions throughout the country. Riparian states in several international river basins created river basin joint commissions,

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[196] *Ibid*.

[197] In 1981, former USA President Ronald Reagan abolished 6 US river basin commissions. See J. Warner *et al.* 'Going with the flow: river basins as the natural units for water management?' (2008) S2 (10) *Water Policy* 121, 121. See Molle (b) (note 169 above; 17); L.A. Teclaff (a) *The River Basin in History and Law* (1967), 26-74.

[198] *Ibid*. Molle; *Ibid*. Teclaff; *Ibid*. Warner *et al.*

[199] France made plans embracing river basins by the year 1920, under a law adopted in 1921, which envisaged the development of the entire French part of the River Rhône. A few years later, the USA's President Committee on Water Flow tentatively recommended ten basins (one of which was the Tennessee) for a comprehensive development. Information available at *https://www.govinfo.gov/app/details/GPO-CRECB-1934-pt9-v78/GPO-CRECB-1934-pt9-v78-3-1,* accessed on 22 May 2019.

[200] The Tennessee Valley Authority [hereinafter TVA] was established under the "Tennessee Valley Act", on May 18, 1933, and placed under the direct responsibility of the USA president. It was diversely tasked for the holistic development of the river basin. Details of the TVA available at *https://www.history.com/topics/great-depression/history-of-the-tva*, accessed on January 10, 2019; See G.F. White 'A perspective of river basin development' (1957) 22 Law *& Cont Prob* 157, 167.

based on the TVA model, and agreed to cooperate around the management of their common transboundary water resources. Examples to confirm this include the Columbia,[201] the Mekong,[202] and the Indus river basin.[203]

A similar move of river basin institutions was noticed in Europe. The French government, for instance, signed the 1964 Law on the Regime and Distribution of Water resources and their protection Against Pollution, under which it established river basin institutions, which were to operate under a national committee.[204] Great Britain remained very supportive of the river basin concept for a long period. On several occasions, the government overhauled its national water administration in the quest for more consolidation of river basin management, as testified by Section 32 of the 1948 British River Boards Act.[205]

Besides the 1911 Madrid Declaration, the 1966 Helsinki Rules gave significant support to the river basin concept. The 1966 Helsinki Rules became the first international non-binding instrument to broadly recognize and attempt to equip the river basin concept with a legal definition. [206] The 1966 Helsinki Rules defined an international drainage basin "a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus."[207] Nonetheless, it appears as if the appetites of many

[201] For decades, both the United States and Canada developed their respective parts of the Columbia River basin separately. Thanks to the 1961 Columbia River Treaty, the two countries agreed to establish a joint development for power generation. See generally the Treaty relating to Cooperative Development of the Columbia River Basin of January, 17, 1961, between the U.S. and Canada.

[202] The adoption of the Statute of the committee for coordination of investigations of the lower Mekong Basin of 31 October 1975, established by the Governments of Cambodia, Laos, Thailand and the Republic of VietNam.

[203] The adoption of the "Indus Waters Treaty" of September 19, 1960.

[204] Teclaff (d) (note 165 above; 363).

[205] Available at *http://www.legislation.gov.uk/ukpga/1961/48/schedule/FIRST/part/II/crossheading/the-river-boards-act-1948/enacted*, accessed on 05 May 2019; See also the British Water Act of 1973, available at *https://www.legislation.gov.uk/ukpga/1973/37/contents*, accessed on 05 May 2019.

[206] N. Spulber & A. Sabbaghi 'Privatizing Water Supply and Distribution' In Springer, Dordrecht (Eds) *Economics of Water Resources: From Regulation to Privatization* (1994) 195, 195.

[207] Article II of the 1966 Helsinki Rules.

stakeholders were not satisfied by the definition of the concept which was proposed by the 1966 Helsinki Rules.[208]

Because of that, some countries began retreating from the concept. The British, for instance, privatised their river basin institutions in 1989.[209] The USA abolished a bit earlier the basin commissions, which the country established under the 1965 Water Resources Planning Act.[210] Whereas in many other western countries, water transfer projects that were discussed later on made no mention of the river basin concept any longer, thus confirming a serious political abandonment of the concept.[211] However, the concept survived its "death sentence", perhaps thanks to the broadening of its meaning, which included several other resources apart from waters.

The adoption of the ecosystem approach by American environment activists helped consolidate the river basin concept. The American environment activists included environmental and developmental aspects in the river basin concept.[212] It was in this context that the Dublin Statement on water and sustainable development also known as the "Dublin Principles" was proclaimed.[213] The Dublin Statement was followed with the conception of the Integrated Water Resources Management approache, and later the adoption of the 2000 Water Directives of the European Union.[214] All these instruments referred to the river basin concept, thus proving a concept recovery and a renewed trust from the states.[215]

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[208] Spulber & Sabbaghi (note 206 above; 195).

[209] B. Hall 'Environmental Regulation in the United Kingdom: Its Development to the Present Day and Trends for the Future, Analysis and Perspective' (1989) 12 *Int'L Envtl. Rep*. 461, 464-466.

[210] Former USA President R. Reagan abolished six USA river basin commissions in 1981; Molle (b) (note 169 above; 17).

[211] USDI *Pacific Southwest Water Plan VI-8* (1963).

[212] On the view of the proponents of the ecosystem approach, water resources were to be managed on the basis of river basins in an integrated way. See for more infos the IUCN *Vision for Water and Nature: A World Strategy for Conservation and Sustainable Management of Water resources in the 21st Century* (2000), viii & x.

[213] The Dublin statement on water and sustainable development was adopted in January 26-31, 1992 in Dublin, Ireland, during a meeting of worldwide experts on water resources. They gathered concerning problems which the resource faced and that were noticed at that time. The Dublin Principles are available at *https://core.ac.uk/download/pdf/85211215.pdf* , accessed on 14 July 2019.

[214] See section 8.3.5 below.

[215] Warner (note 197 above; 121).

2.3.3.4 The river basin concept in developing countries

The Evolution of the river basin concept, which took place in the western hemisphere, as highlighted above did not much include the developing world because most developing countries were still under colonisation. Colonial powers would nevertheless make use of the river basin concept in regions such as Africa, Asia, and the Americas, in the same sense as they did back in Europe. The enormous potential of irrigation, which they remarked in large African rivers, raised great interests in them to the extent that they discussed the possibilities of undertaking basin-wide development projects. This is why Molle[216] could argue that the developments that took place around the river basin concept in the developing countries were children of colonialism.

In countries such as India, Egypt or Sudan, massive works were undertaken by the colonial powers, [217] who were perhaps motivated by the US and European success stories, whereby miracles of large-scale land reclamation, irrigation, flood control, and dam construction took place.[218] The end of World War II led to a spread of the establishment of basin authorities in several developing countries worldwide.[219] The US TVA model discussed above became a model for many of the basin authorities that were established.

The Niger River Authority, Senegal, and the Nile river basins were all established during this post World War II cohort, with the task of promoting basin-wide integrated development on the basis of water cooperation.[220] But these 'clones' of the US's TVA as Warner[221] would later call them, mainly served as supporting institutions for the

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[216] F Molle & P. Floch 'The "Desert Bloom" Syndrome: Politics, Ideology, and Irrigation Development in the Northeast of Thailand' (2008), 1.

[217] *Ibid*.

[218] The first Aswan Dam was planned on the Nile for irrigation and navigation purposes in the year 1890. See for more details Molle (b) (note 169 above; 7); The Mekong and Irrawaddy deltas' examples are available at *https://wle-mekong.cgiar.org/changes/where-we-work/irrawaddy-river-basin/*, accessed on 24 July 2019.

[219] *Ibid*.

[220] In the 1960s, the nine states of the Niger River basin signed a treaty for cooperation in the industrial and agricultural exploitation of the basin. The same treaty established also a commission, which later became the Niger Basin Authority, under the "Convention Creating the Niger Basin Authority of January 21, 1980", available at *http://gis.nacse.org/tfdd/tfdddocs/418ENG.pdf* , accessed on 24 July 2019.

[221] Warner (note 197 above; 121).

building of dams, instead of pursuing the holistic development of river basins, as did the TVA.

2.3.3.5 The river basin concept in the contemporary epoch

Due to the current environmental challenges, there is a general regain of interest in the river basins concept. Goal number 6 of the 2030 Sustainable Development Goals of the United Nations, for instance, institutes the river basins concept as the physical and operational unit for water resources development at national and international levels.[222] Approaching the river basin as a whole is proven vital, because it contributes more effectively to ecosystem integrity, preservation, development and climate change adaptation, than a fragmented approach.[223]

For Warner,[224] the river basin approach is the best in addressing the current environmental crisis, whereas Sadoff[225] found that the approach offered higher efficiency and benefits in terms of water developments. Within the same river basin, some parts may be either more inclined or naturally favourable to some types of activities than others. Activities such as fisheries, food, fibre production, hydropower generation, recreation or navigation, for instance, cannot be conducted evenly and with similar results in different locations of a single river basin. Approaching river basins as whole allowed water planners to find better locations for specific activities, based on sites potentialities and comparative advantages across the basin.

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[222] Sustainable Development Goals (SDG) are the United Nation's blueprint to achieve the goal of a better and more sustainable future for all. The SDG address the global challenges that the whole world faces, including environmental degradation, climate-related challenges, poverty, inequality, prosperity, peace, and justice. Each SDG interconnects with the others, and their targets have to be achieved by 2030. SDG 6.5 for instance reads: "By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate." See for more details: *https://www.un.org/sustainabledevelopment/sustainable-development-goals/*, accessed on 22 May 2019.

[223] Warner qualified as "holy trinity", the triad formed by *i.* the multi- stakeholder platforms, *ii.* the Integrated Water Resources Management strategy, and *iii.* the river basin concept, which he regards as "three globally hegemonic trends in water governance"; See Warner (note 197 above; 121).

[224] *Ibid*. Warner.

[225] See Sadoff (note 172 above; 17); See D. Whittington & J. Song 'Why Have Some Countries on international rivers been successful negotiating treaties? A Global Perspective' (2004) 5 (40) *Wat Res Res, 1.*

There is even a newer consideration, according to which the river basin concept should be approached with a look beyond the sole and limited prism of water resources.[226] Modern trends in water governance recommend multi-stakeholder platforms the Integrated Water Resource Management strategy (IWRM), which they should ideally apply at the river basin level.[227] The IWRM is defined as "A process which promotes the coordinated development and management of water, land, and related resources, in order to maximise the resultant economic and social welfare equitably without compromising the sustainability of vital ecosystems."[228]

Under the IWRM principles, water management is supposed to take place under autonomous basin-wide administrations well known as "River Basin Commissions". Despite an existing propensity to clashes between the IWRM principles and the countries' perception of the principle of states sovereignty over natural resources, River Basin Commissions are to be put in place in a cooperative way by riparian countries, because the IWRM principles maintain river basins as natural units for water management.[229] The principles have also enriched the river basin concept with the dimension of ecosystem management, which means that there included in the concept a broader set of other natural resources.

2.3.4 Transboundary river basins in the climate change era

Whereas there are river basins that are shared by only a few numbers of states, others are shared between several states. River basins that have a high number of riparian states are usually complex to manage, in comparison to river basins that have smaller numbers of basin states. It is predicted that climate change would exacerbate such complexity if the appropriate legal measures are not preventively adopted. Scientists have claimed that "river

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[226] S. Stanković *et al.* 'Impacts of extreme hydrological events on sustainable water resources management and human well-being' (2019) 1 (9) *Saf E*ng 37, 40; J. Friesen & L. R. Sinobas *Advanced Tools for Integrated Water Resources Management* Vol 3 (2018); Roy (note 43 above).

[227] *Ibid*. Stanković *et al.*; *Ibid*. Friesen & Sinobas; *Ibid*. Roy.

[228] *Ibid*. Friesen & Sinobas ; see also Caponera & Nanni (note 147 above; 9).

[229] L. De Stefano *et al.* 'Mapping the resilience of international river basins to future climate change-induced water variability' Discussion Paper (2010), 15.

basins" will be the surface units that will witness most of the impacts of climate change on water resources.[230]

There are worldwide 310 international river basins,[231] which are home to more than 45 percent of the world's population, and cover about 47 percent of the planet's surface, while accounting for up to 60 percent of the river flows globally.[232] Africa has 63 transboundary river basins; these basins carry about 93 percent of the continent's freshwaters and are home to 77 percent of its population.[233]

The current figure of 310 International river basins was a finding of McCracken & Wolf, [234] in 2018. As Biswas[235] observes, scholars did not give due consideration to the river basin concept over the last three decades, and because of that, precise data could not be generated on that particular landscape as it is the case currently. Before the year 2000, the only available source of data on international river basins was a 1970 edition of a 1958 UN panel report on Integrated River Basin Development.[236] Table 1 below displays the evolving number of transboundary river basins over the years.

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[230] See section 2.2.6 above.

[231] Mccracken & Wolf (note 23 above; 1-3).

[232] *Ibid*. Mccracken & Wolf; Transboundary river basins cover 47 % of the plant's surface excluding Antarctica; UNEP (a) (note 35 above; 39); A. Jägerskog *Why states cooperate over shared water: The water negotiations in the Jordan River Basin* (Unpublished PhD thesis, Linköping University Electronic Press, 2003), 2.

[233] *Ibid*. UNEP (b); IPCC (2014) (c) (note 4 above; 290); C. Chikozho 'Towards best-practice in transboundary water governance in Africa: exploring the policy and institutional dimensions of conflict and cooperation over water' in Palgrave Macmillan (eds) *Rethinking Development Challenges for Public Policy* (2012) 155, 155.

[234] Mccracken & Wolf (note 23 above; 1-3).

[235] Biswas (note 171 above; 6-8).

[236] Report available at *https://www.ircwash.org/sites/default/files/214.0-70IN.pdf* , accessed on14 April 2019.

Table 1: The evolving number of transboundary river basins from 1958 to 2018

River Basin Study	Number of Transboundary River Basins	Transboundary basins' percentage of the world's land surface
1970 Edition to a 1958 UN panel report	166	-
1978 Register UNCNRET	214	47.0
1999 Update by Wolf *et al.*	261	45.3
2010 Update by De Stefano *et al.*[237]	276	46.1
2014 Hydro-Political Dependency Study[238]	456	47.7
2016 TWAP, UNEP-DHI Study	286	46.2
2018 Update Wolf *et al*	310	47.1

Source: McCracken & Wolf[239]

The table above reveals a growing number of international river basins over the years. The main explanatory factors are *first* the methodologies used each time the estimations were made, and *second*, the evolution of the number of the states over time. State unification or states dismantling has represented whether a drop or an increase in the number of transboundary river basins. Examples of state dismantling that have provoked an increase in the number of River basins can be drawn from the dislocation of the former Union of Soviet Socialist Republics (USSR) in the nineties. The implosion of the former Yugoslavia between the year 1991 and 2008 can also be mentioned in the same view.[240]

[237] De Stefano *et al.* (note 229 above; 2).

[238] L. Beck *et al.* 'Implications of hydro-political dependency for international water cooperation and conflict: Insights from new data' (2014) 42 *Pol Geo*, 23, 23.

[239] Mccracken & Wolf (note 23 above; 1-3).

[240] For details on the collapse of the former USSR, see 'The Collapse of the Soviet Union' available at *https://history.state.gov/milestones/1989-1992/collapse-soviet-union,* accessed on 23 July 2019; Regarding the collapse of Yugoslavia, see E.S. Herman & D. Peterson 'the dismantling of Yugoslavia', available at *https://www.globalpolicy.org/component/content/article/173/30482.html* accessed on 23 July 2019.

2.3.5 The river basin concept and states boundary

International law is erected on the concept of *the state*,[241] which in turn, is built upon the pedestal concept of *national sovereignty*, which itself rests on the tangibility of a state's territory. The territorial boundaries define a state's territory; it thus brings to a state the guarantee of its geographical existence.[242] Boundaries are defined as: "the outer edges of a territory within which a state can exercise exclusive power".[243] They are the point of the line that marks the territorial space within which a state exercises its sovereignty.[244] State boundaries are politically decided, whereas the river basin's boundaries are naturally determined.[245] It is, therefore, much common to see a state's political boundaries not matching a river basin's boundaries, that the opposite.[246]

The delineation of a river basin consists of indicating the exact position of its boundaries, which in most cases intersects states' political boundaries. This delineation has, in general, proven to be a complex exercise, be it in political or in cartography terms.[247] A glance at the Map of the international river basins gives an idea about the explexity of this task, as there are approximately 145 countries that form the 310 transboundary river basins of the world. Thirty-three of these has as much as 95 percent of their territories immersed within transboundary river basin's boundaries. The DR-Congo, Chad, Niger, and Zambia are of this category. The Parnu and Seine River basins are two examples that are very close to the river

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[241] M.N. Shaw *International Law* 5 ed (2003), 409.

[242] *Ibid*.

[243] V. Prescott & G. D. *Trigg International Frontier and Boundaries, Law, Politics and Geography* (2008), 140.

[244] N.A. Lantera *Assessing The Efficacy Of African Boundary Delineation Law And Policy: The Case of Ethio–Eritrea Boundary Dispute Settlement*" (Unpublished PhD thesis, Golden Gate University, 2016), 23.

[245] McCaffrey (a) (note 145 above; 41).

[246] See procedure of determining river basins in note 246 above.

[247] The delineation of a river basin is an activity that is realised by steps. "*The first step* is to define the point where the main outlet leaves the basin. *The second step* is to define the primary drainage network. *The third step* is to add additional tributaries. *The fourth step* is to define the adjacent drainage networks (streams and rivers). *The fifth step* is to locate hilltops and ridges between drainage basins. *The sixth step* is drawing the divide, by connecting the dots, follow the contours and staying along the ridges." See further details in *http://www2.ivcc.edu/phillips/geology/db_divide/step6.htm*, accessed on 12 April 2019.

basin fully contained within a single state's territory.[248] Parnu is for up to 99.9 percent in Estonia, whereas the Seine is 99.9 percent, French.

States mistrust towards the river basin concept, as said earlier, came also from the fact that river basins define their own natural perimeter, in complete ignorance of states political boundaries. In comparison to states boundaries, the boundaries that are naturally defined by river basins can be either transboundary or contained within a single state. Say state A and state B are neighbours and are both included in the same transboundary river basin, if there is across such a river basin a river that flows exclusively across State A and does not enter into State B, and if state B does not have any tributary that discharges into State A's river or vice versa, the river basin thus formed by these two states is still considered as an international river basin.[249] This, in substance, is what Article 3 of the 2004 Berlin Rules meant by defining an International Drainage Basin as: "a drainage basin extending over two or more States".[250]

The explanations above imply that country B will be considered as part of the international river basin alongside country A. The membership of a state to an international river basin is geographically determined.[251] All that is needed is that all the downhill drains, rains or snow melts from such a state may be drained topographically towards the river basin's final outlet.[252] Despite state B being part of the river basin which it forms with state A, state B would not be regarded as a riparian state to the watercourse stemming from such river basin, if such watercourse flows exclusively through state A, with no water inputs from state B. In other words, the fact that the political boundaries of the state

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[248] The Parnu River basin is shared between Estonia (99.9 percent) and Latvia (0.1 percent), whereas the Seine River basin is shared between France (99.9 percent) and Belgium (0.1 percent). See Mccracken & Wolf (note 23 above; 1-3).

[249] G. Baranyai *European water law and hydropolitics: an inquiry into the resilience of transboundary water* governance in the European Union. (unpublished Ph.D Thesis, Pázmány Péter Catholic University, 2019), 14.

[250] See Article 3 of the 2004 Berlin rule on water resources; See also S. Dinar *International water treaties: Negotiation and cooperation along transboundary rivers* (2007), 132.

[251] Baranyai (note 249 above; 14-20); *Ibid*. Dinar; See Article 3 of the 2004 Berlin Rules.

[252] See generally F. Molle 'River basin management and development' (2017); F. Molle & P. Wester River Basin Trajectories (2009) *Soc Env & Dev;* M. Newson *Land, Water and Development: Sustainable Management of River Basin Systems* 2nd ed. (1997); N. Wengert 'The River Basin Concept as Seen from a Management Perspective in United States' in J. Lundqvist *et al. Strategies for River Basin Management* (1985), 299–305.

B overlap or intersect at some points the river basin's boundaries justifies the inclusion of state B in the transboundary river basin but does not make of it a riparian state to the transboundary river that flows through the same river basin, but exclusively through State A.[253]

Also, the distinction established between river basins and watercourses implies that a state may be part of an international river basin without being a riparian state to the basin's transboundary watercourse.[254] This precision was crucial to bring more light between the river basin concept and the watercourse concept to be discussed in the next section. Understanding this distinction is crucial because of the differences in the legal implications of these two situations that are explained above.

2.4 "International", "transboundary", and "shared" river basins and watercourses

References to river basins (or watercourses) that are common to more than one state in this thesis will often be done by using interchangeably the concepts "international", "transboundary" and "shared".[255] Therefore, it seems relevent to briefly discuss them, in order to highligh the similarities and variences thereof, and the probable implications of using either of these concepts within the context of the Congo River basin.

The concept "transboundary" means what is "moving or having effect across a boundary or boundaries".[256] In the context of international water law, it is generally used to refer to a river basin (or a watercourse) that cross over a state's borders into the territories of at least another state.[257] It can also be used in case of a watercourse defining a border between at least two states. Owing to the definition of what constitute "international" as

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[253] Baranyai (note 249 above; 14-20).

[254] See section 2.3.5 above.

[255] Several authors have also interchangeably made reference to these three concepts in a single publication. See for instance: FAO *The Law of International Water Resources* (1980), 164; P.Q. Hoffmannn & O. McIntyre *Transboundary Water Law and Policy - Exchanging Experiences across African River Basin Organisations* (2015), 31.

[256] *https://www.oxfordreference.com/view/10.1093/acref/9780195369380.001.0001/acref-9780195369380-e-1816 , accessed on 16 November 2020.*

[257] G.A Rojas & A. Iza 'Governance of Shared Waters. Legal and Institutional Issues' (2011) *Gland Switzerland*, 164.

different from "national", a river basin (or a watercourse) that crosses, form, or intersects states' boundary becomes an "international"/ "transboundary" river basin or watercourse.

"Intrenational" is defined as "what exists, occurs, or is carried on between nations".[258] Both "international" and "transboundary" suggest the existence of political boundaries or borders between the intersected States.[259] In water treaty practice, some States are favourable to the use of the concept "transboundary", rather than "international" because the concept "international" would give the impression that the watercourse that is targeted by such treaty had an international status, which in other words implies that such water body is owned in common.

At a national level, a State is entitled to a full jurisdiction over all its water resources, provided these waters originate in and discharge from the State's own territory, without crossing over or forming a border with another state.[260] Otherwise, the resource will become "transboundary", with an obligation to be shared in total or in part with the other states that are traversed. Even though river basins generally include several natural resources, water is the only resource on which a shared sovereignty can be applied, because of its natural mobility.[261] The other resources cannot be targeted as they generally have a static nature.

To "share" means to possess, use, occupy, or enjoy in common with another or others".[262] Something (such as water resources) that is "shared" is "possessed, used, occupied, or enjoyed in common with another or others".[263] The fact that a river basin (or a watercourse) crosses over a state's border to join the territory of another state implies that such river basin (or a watercourse) is shared by the two states, and the sovereignty over its waters "shared" between the states that are thus traversed by its flows. Such shared

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[258] *https://www.oxfordreference.com/view/10.1093/acref/9780195369380.001.0001/acref-9780195369380-e-1816 , accessed on 16 November 2020.*

[259] See section 2.3.5 above.

[260] G.A Rojas & A. Iza (note 257 above; 164).

[261] See section 2.5 for more details on watercourses.

[262] *https://www.oxfordreference.com/view/10.1093/acref/9780195369380.001.0001/acref-9780195369380-e-1816 , accessed on 16 November 2020.*

[263] *Ibid.*

sovereignty will apply whether on the whole watercourse, or only on part of it, depending on the hydro-geographical characteristics of the watercourse in concern.[264]

In general, States of the Congo River basin are not yet engaged into signing water treaties between them, as it will be discussed further.[265] While drafting water treaties in future, it is more likely that the States of the basin will have to operate a choice between either of these concepts. The cautious use of both the "transboundary" and "international" concepts in the notorious 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes can inspire treaty makers within the Congo Rivers basin. While the concept "international" might be restrictively refered to because of its apparent flavour of an international status being attached to the considered water body, the concept "transboundary" might receive more approbation as it only captures the crossing by a river of states' political boundaries, as explained above.

2.5 The Watercourse

2.5.1 Background information

The whole architecture of the 1997 UNWCC and its international regime on the non-navigational uses of transboundary water resources seem to be resting mainly on the concept of "watercourse". *Watercourse* as a concept was preferred to *river basin* by the majority of states during the long years of negotiations of the 1997 UNWCC. States judged the *watercourse* concept to be more suitable for the 1997 UNWCC than the *river basin* concept.[266] They wanted to be reassured that the regime of the 1997 UNWCC, once in power, would apply to water resources only, and not extend to or affect any other natural resource. States' concern was right, because as discussed earlier,[267] the river basin concept has a broader meaning, and includes several other natural resources besides water resources. This implies that all the other resources were to be equally affected if the concept of *river basin* was to be adopted by the 1997 UNWCCC instead of the watercourse concept as it did.

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[264] G.A Rojas & A. Iza (note 257 above; 164).

[265] See sections 6.2, 6.3 and 6.4 below.

[266] UN/ILC 2000. *Yearbook of the International Law Commission* (2001) Vol. 1, 48.

[267] See section 2.3.3.5 above.

2.5.2 Defining "watercourse" and "transboundary watercourse"

Article 2.a of the 1997 UN Convention on the Law of Non-Navigational Uses of International Watercourses defines a *watercourse* as: "a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus"[268] During the negotiations that led to the 1997 UNWCC, several alternative concepts were proposed by states. The watercourse concept is the one that was eventually retained.[269] States were conscious that the concept to be chosen would occupy a central position in the 1997 UNWCC regime, and in addition, a core position in international water law. That is why States took the time to decide on which concept suits better the upcoming water convention.[270]

Watercourses are either domestic or international. Domestic watercourses are the watercourses that do not cross over a state's territorial boundaries.[271] Their sources and mouth are both located within the boundaries of a single state. The regulation of a domestic watercourse falls on the state that owns it. The transboundary watercourses are the watercourses that cross over a state's national boundary and enters another state's national territory. Transboundary watercourses are either contiguous or successive.[272] The contiguous are transboundary rivers that define a border between the states which they separate; they are sometimes referred to as border-creator rivers.[273] The successive are transboundary rivers that flow straight from one country into the other without forming a border between them.[274] Between these two main types, Dinar[275] identified thirteen other types, which have each the potential to raise particular legal problems.

The 1997 UNWCC has adopted the equivalent concept of "international" watercourse, to the concept of "transboundary" watercourse. Article 2(b) of the 1997

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[268] Article 2.a. of the 1997 UNWCC.

[269] UN/ILC 2000. *Yearbook of the International Law Commission* (2001) Vol. 1, 48.

[270] *Ibid*.

[271] Article 2.a. of the 1997 UNWCC.

[272] Dinar (note 250 above; Appendix B, p1); Contiguous rivers may originate from one riparian state before forming the boundary between two or more states. See Dinar (note 250 above; 271).

[273] *Ibid*. Dinar.

[274] 100 transboundary rivers are of this category. *Ibid*. Dinar at Appendix B.

[275] Dinar (note 250 above; 280).

UNWCC defines an *International watercourse* as "a watercourse, parts of which are situated in different States."[276] Transboundary watercourses are regulated by international law, and has to be conjointly managed by the riparian states of the transboundary river, in consistence with mutually agreed regulatory instruments.

The internationality of a watercourse is politically decided, based on hydrographical factors, when states boundaries have been established. It follows from the above definition of an international watercourse that, will be considered part of an International watercourse any river, water flow, tributary, lake, or groundwater that is linked to such International watercourse, even if such river, water flow, tributary, or lake are entirely located within only one riparian state.[277]

Under the 1997 UNWCC, once a watercourse crosses a state's political boundary, in total or in part, it takes on an international status.[278] As Bearden observes[279] the decision to include in the watercourse concept a river's tributaries, and any lake and groundwaters that may connect to it constitute an important innovation in the 1997 UN Water Convention and its regime. The analysis of several transboundary water agreements has revealed that tributaries and groundwaters to the river upon which the agreements were signed were often not taken into consideration.[280]

2.5.3 Genesis and evolution of the watercourse concept

The watercourse concept is not new, as recalls the ILC.[281] The concept has a long existence in states practices particularly and was referred to in several international treaties on navigation in international waterways, under its *operational* equivalent that is *river*

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[276] J. Fry & A. Chong 'International Water Law And China's Management Of Its International Rivers' (2016) *B Col Int&Comp LRev* 2 (39), 227.

[277] A. Rieu-Clarke *et al. UN Watercourses Convention, User's Guide* (2012), 77.

[278] Read together paragraphs (a),(b) and (c) of Article 2 of the 1997 UNWCC.

[279] B.L. Bearden 'Following the proper channels: tributaries in the Mekong legal regime' (2012) 2 (14) *Wat Pol* 991, 993.

[280] *Ibid*. See chapter 3 and 4 below fro further details on transboundary water agreements.

[281] ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 91.

system.[282] The 1919 Versailles Treaty, for instance, used the water "system concept" which is an equivalent to the watercourse concept.[283]

> Article 331 of the 1919 Treaty of Versailles provided:
>
> "The following rivers are declared international: the Elbe (Labe) … the Danube from Ulm; and all navigable parts of these river systems which naturally provide more than one State with access to the sea, with or without transhipment from one vessel to another; together with lateral canals and channels constructed either to duplicate or to improve naturally navigable sections of the specified river systems or to connect two naturally navigable sections of the same river."[284]

In the *River Oder* case, the Permanent Court of International Justice (PCIJ)[285] held that, under the 1919 Treaty of Versailles, the international status of the Oder River was to be extended to:

> "all navigable parts of these river systems ... together with lateral canals or channels constructed either to duplicate or…to improve naturally navigable sections of the specified river systems."[286]

However, the difference between the modern watercourse concept and its historical equivalents stems from the fact that under the 1997 UN Water Convention, the concept includes groundwater resources.[287]

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[282] *Ibid*. at 92.

[283] *Ibid*.

[284] See Article 331 and article 362 of the 1919 Treaty of Versailles, which refere to "the Rhine River system".

[285] Details on the *River Oder case* in section 3.5.5 below*;* The Permanent Court of International Justice [hereinafter PCIJ], was the predecessor of the International Court of Justice [hereinafter ICJ]. The PCIJ was established by the League of Nations. It set for the first time in 1922, and was dissolved in 1946. The PCIJ was the first permanent international tribunal vested with general jurisdiction. Its work has contributed to the development of international law. During its 18 years of life, the PCIJ dealt with 29 contentious cases in total, which were pronounced between States, and has delivered 27 advisory opinions; PCIJ details in : *https://www.icj-cij.org/en/pcij* , accessed on 17 January 2019.

[286] *See Case Relating to the Territorial Jurisdiction of the International Commission of the River Oder* (United Kingdom, Czechoslovakia, Denmark, France, Germany and Sweden v Poland), Judgment No. 16 (PCIJ. Ser. A, No. 23, 1929) 5, 27. Available at *https://www.icj-cij.org/en/pcij* , accessed on 17 January 2019.

[287] See definition of watercourse under UNWCC.

The history of the entry of the watercourse concept in the language of international water law can be traced back to the 1970s when the Sixth Committee of the UNGAS issued a request to the ILC to consider a "Progressive Development and Codification of the Rules of International Law Relating to International Watercourses."[288] The ILC became aware of the efforts it had to deploy in order to successfully deal with the geographic dimensions of the international rivers because the subject matter was one of the major impediments towards the codification of the law of the non-navigational use of the international water laws which was in progress.[289]

In 1976, the ILC launched a special survey with the aim of gathering states' opinions on the concept of the *international drainage basin* as to whether it could be the appropriate core concept of the future 1997 UN Water Convention, which at that time was still being studied. Many states responded to the survey showing their objection to the use of the *international drainage basin* concept in the transboundary water regime that was in incubation. The motive was that the scope of the drainage basin concept could include not only water resources, but also the lands, and possibly other resources that are present in river basins.[290] Countries such as Brazil, Afghanistan, Peru, the USSR, and Iraq were among those who firmly opposed, in particular, the use of the *drainage basin* concept.[291] Brazil opposed the concept to protect its continental power. Brazil has enormous river basin linkages with its neighbouring countries and therefore feared that external influences through the drainage

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[288] Jr Wescoat & L. James 'Beyond the river basin: The changing geography of international water problems and international watercourse law' (1992) 3 *Colo. J. Int Envtl. L & Pol'y* 301, 303; See also S.C. McCaffrey (i) 'Historical background to the 1997 UN Watercourse Convention' available at *http://legal.un.org/avl/ha/clnuiw/clnuiw.html* , accessed on 13 May 2019.

[289] ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 92.

[290] See generally the *Proceedings of the United Nations Water Conference of 1977*, available at *https://www.ircwash.org/sites/default/files/71UN77-161.6.pdf*, accessed on 17 June 2019; L.A. Teclaff (c) *The river basin in history and law* (2012), 10-11; For a full accesses to states' views on the geographical scope of the river basin concept, see states reply to the ILC questionnaire, available at *http://untreaty.un.org/ilc/ documentation/english/a_cn4_294.pdf*, accessed on 23 April 2019. For further commentaries on states' view on the river basin concept, see A. Tanzi & M. Arcari *The United Nations Convention on the Law of International Watercourses: A Framework for Sharing* (2001).

[291] Wescoat & James (note 277 above; 303).

basin approach would have found a way to interfere with the country's approach to water resources management.

The rich discussions that took place among the members of the ILC and the sixth Committee during nearly twenty years eventually led to the adoption of the *watercourse* concept. Schwebel, the ILC's second special rapporteur, was, in 1980, the first to mention the term *watercourse*.[292] Schwoebel used at that time the concept *watercourse system* instead of the *watercourse*,[293] which he described as "a refined form of the *drainage basin* concept",[294] which included a broad network of tributary flows, groundwaters, and associated runoffs without including the other resources.[295] It also satisfied the will of states to continue viewing water resources in their natural unity and interconnectedness, especially those that flow within a single river basin. That is why the concept of *watercourse system* received great support from states and referred to it as the closest substitute to the rejected *drainage basin* concept.[296]

This is better understood once one considers the fact that polluted surface waters will most often contaminate the groundwaters with which they are in connection and vice versa. Besides, disproportionate underground water withdrawals have the potential to affect the rate of surface water flows, whereas a reduced recharge from the surface can contribute to drying an underground water body.[297] This is the reason why the approach that was chosen by the 1997 UNWCC concerning the watercourse concept had to echo states' call for further attention to the natural interconnectedness existing between all the parts of a hydrographical system within a river basin.[298]

As opined by the Republic of Finland while replying to ILC's inquiry on the account of the codification of the international law of the non-navigational uses of the transboundary waters: "Due to this coherence, there exists, irrespective of the political

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[292] *Ibid*. Wescoat & James at 314; ILC *Year Book 1980* (1980) Vol 2, 159, 167-170.

[293] *Ibid*.

[294] ILC *Year Book 1980* (1980) Vol 2, 159, 167-170.

[295] This was for the first time that a reference was made to the *system* concept. See *1554th Meeting Report, The Law of the Non-Navigational Uses of International Watercourses,* in ILC *Year Book 1980* (1980) Vol 2, 104.

[296] Wescoat & James (note 277 above; 303).

[297] Articles 21, 22, and 23 of the 1994 Draft Articles of the 1997 UNWCC.

[298] McCaffrey (a) (note 145 above; 25).

borders, a legally relevant interdependence between the various parts of the watercourse belonging to different states."[299] States are to understand that any significant effect on either part of such interconnected system, whether surface or underground, have the potential to spread around and touch other parts of the system, which may be in other countries.[300]

2.5.4 The watercourse concept in the heart of the 1997 UNWCC Regime

As noticed by McCaffrey,[301] it may feel natural to think that a watercourse is the equivalent of a "river", whereas, in reality, it is not. There are sharp contrasts between the two concepts. The sense given to a *watercourse* under the 1997 UN Water Convention is much broader to what a pure *river* means. In "watercourse" are included several other water bodies such as aquifers, glaciers, lakes, rivers, canals, reservoirs, wetlands, and floodplains, provided these are interconnected with each other to form a single water system, referred to as a watercourse.[302]

The inclusion of the other water bodies such as groundwaters in the *watercourse* concept was dictated by some hydrological factors, including the concern of taking into account the place occupied by the groundwaters in the total amount of the planet's freshwaters.[303] Scientists' evidence established that most of the world's freshwaters were underground waters and that these were often in communication with surface waters, with which they formed an interconnected system.[304] The total volume of Freshwaters is divided between ice form and snow cover (68.7 percent), groundwater (29.9 percent), and river systems, lakes, and reservoirs (0.26 percent).[305]

After the adoption of the *watercourse* concept during the ILC discussions, the most crucial problem remained its geographical scope.[306] In other words, to what extent

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[299] ILC *Year Book 1976* (1976) Vol 2 part I, 155.

[300] S. McCaffrey (j) 'The UN Convention on the Law of the Non-Navigational Uses of International Watercourses: prospects and pitfalls' *World Bank Technical Paper* (1998), 17-18.

[301] *Ibid*. McCaffrey.

[302] Articles 2, 3, and 4 of the *1994 Draft articles of the 1997 UNWCC.*

[303] McCaffrey (a) (note 145 above, 26-27).

[304] UNESCO *World Water Balance and Water Re- sources of the Earth.* (1978), 663.

[305] *Ibid*.

[306] Wescoat & James (note 277 above; 303).

the tributary rivers that discharge into the main water body of a river basin has to be considered as part of an international watercourse? Moreover, what would it imply to both such tributary and the state wherefrom such tributary originates?

As one may notice, despite the consensus that states ultimately secured on the watercourse concept, they could not agree with each other any further and find a consensus that pleased all of them on the international application of the watercourse concept, which they agreed upon. The fact that they could any longer agree left a stern shadow zone around the legal implications that were attached to the watercourse concept in transboundary contexts.[307]

When the time finally came to decide on what to include in the international watercourse concept, the ILC special rapporteur recommended the abandonment of a vital section of a proposition from some member states that was earlier submitted for consideration. This is in substance what the abandoned vital section was reading:

> "To the extent that parts of the waters in one State are not affected by or do not affect uses of waters in another State, they shall not be treated as being included in the international watercourse system. Thus, to the extent that the uses of the waters of the system have an effect on one another, to that extent the system is international, but only to that extent; accordingly, there is not an absolute, but a relative, international character of the watercourse." [308]

For the special rapporteur, what was curious in this proposition was the concept of the *relative international character* of a watercourse, whereas that "formula" was used to create a contrast between the parts of a watercourse that could be approached as international, against the others that could remain domestic. The special rapporteur recommended the abandonment of the whole paragraph but considered only the definition of the watercourse concept, which was proposed alongside the dropped paragraph.[309]

Despite its abandonment, this paragraph carried a strong opinion from states, which perhaps the ILC should have analysed further instead of dropping because a careful look on what is stated therein reveals a fundamental problem which today may be one of

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[307] ILC *Year Book of 1991* (1991) Vol. 1, 50.

[308] *Ibid*.

[309] Adopted by the ILC 32nd session, in 1980. See *Ibid*. ILC at 108.

the contributing factors to the distancing of the states vis-à-vis the 1997 UN Watercourse Convention. In Wescoat's[310] opinion, there seems to be a wide-reaching discomfort on the regime of the 1997 UNWCC, despite its recent entry into force, as it will be discussed below.[311] The Congo watercourse is highly concerned by this particular discomfort. As it will be discussed below, the implications of applying the "international watercourse" concept to the Congo River and its transboundary tributaries constitute one of the blockages towards successful water cooperation across the Congo River basin.[312]

2.5.5 The physical and geographical configurations of transboundary watercourses

Two factors are considered in this section, namely the physical and the geographical configurations of the transboundary watercourses. Transboundary watercourses hardly have similar physical characteristics;[313] they differ from each other not only in hydrological terms but also in their hydrographical configurations. As posits McCaffrey,[314] "knowledge of the general characteristics of the Earth's water system is necessary for an understanding of the effect of legal rules governing the use of freshwater." As a consequence, the legal, political and institutional mechanisms that are adopted for the management of these types of waters have to be designed on the basis of the rivers' hydrographical and hydrological specificities. Owing to this, Sadoff[315] draws attention to the unique character of the challenges posed by each process of sharing waters and the benefits thereof between riparian states and recommends that each transboundary watercourse may be approached as a particular case.

The geographical configurations of the transboundary watercourses hold to the upstream-downstream positions of riparian states. This configuration poses generally the same types of problems at the global level. The problems they pose have become particularly crucial because of the impacts of climate change on the shared water resources. As will be

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[310] Wescoat & James (note 277 above; 304).

[311] See section 4.4 below for further details on the 1997 UNWCC.

[312] See section 5.5 below.

[313] Sadoff (note 172 above; 15).

[314] McCaffrey (a) (note 145 above; 23).

[315] *Ibid*. at 66.

discussed later,[316] the regime defined by the 1997 UNWCC is struggling to find support from some states, due in part to a series of upstream-downstream problems. There exist some pre-existing problems between upstream and downstream riparian states in several transboundary rivers across the globe, which the adoption of the 1997 UNWCC did not solve.

The most advantaged states often do not press for a water treaty. To such a state, a treaty may mean a relative loss of the control which they are having on the shared resources. Concerning water quality, the geographical factor is decisive. When, for instance, an upstream state pollutes or diverts a transboundary river, the consequences of its action will have to be managed by the downstream state as well.[317] Therefore, the advent of a water treaty in such a circumstance would often not be welcomed by upstream states, as it would mean either preventive and corrective actions, or obligation to compensate the downstream state for any damage.[318] The example that Lowi[319] cites here is the Tigris and Euphrates River basin, where Turkey has become the principal obstacle to water cooperation across the basin, because of its favourable position on both rivers, in comparison to Syria or Iraq. The example of the Egyptian and the Nile river can also be added.

However, different reasonings can be developed that will be focused on the downstream state as well, as it can also happen that a downstream state is the one geographically sitting in an advantaged position. The world's four oldest civilisations, namely China, Egypt, India, and Mesopotamia are the best example of this.[320] These civilisations have developed on the lower sections of transboundary rivers and have over time produced countries such as Egypt and Iraq, located downstream a shared river.[321] These countries often exercise hegemonic control over the transboundary rivers they depend on. Egypt and the Nile offer a perfect illustration. Egypt exercises its hegemony

[316] See section 4.4.5 below.

[317] See sections 4.3.2 and 4.3.3 below for further details.

[318] Based on both the no-harm principle and the polluter pays principle. For details on the polluter pays principle, see P. Sands *Principle of International Environmental law* 2 ed. (2003), 279-284.

[319] M.R. Lowi *Water and Power: The Politics of a scarce resource in the Jordan River basin* Vol. 31 (1995), 1.

[320] I. Kornfeld 'Mesopotamia: A History of Water and Law' In J. Dellapenna & J. Gupta (eds.) *The Evolution of the Law and Politics of Water* (2009) *NY S.* 21, 21-22.

[321] C. Bichsel 'Water and the (infra-) structure of political rule: A synthesis' (2016) 2 (9) *Wat Alt 3*56, 357-359.

over the whole course of the transboundary Nile River, whereas it contributes towards the waters of the Nile River with less than 15 percent.[322]

2.6 Conclusion

This chapter has reviewed some of the key concepts that underpin this thesis. The understanding of these concepts was crucial before considering the involvement of the law in this particular field of transboundary water resources. Concepts such as climate change, river basin, watercourse have been discussed with sufficient details to ensure a better understanding and informed use thereof throughout this thesis. As the impacts of climate change on water resources continue to grow in complexity, issues concerning transboundary watercourses and river basins will be increasingly discussed. Climate change is here and will remain for times that are not yet specified. There is a consensus that the phenomenon will continue occurring for centuries, even if its causing effects were entirely removed. Minimising the adverse impacts of climate change will require diverse strategies, including the legal strategies for states preparedness for impact absorption, particularly in the field of transboundary water resources. Chapter two has, in particular, helped clarify the fundamental differences which exist between the concepts of river basin and watercourse. Although these two concepts have many similarities, they also have crucial differences. Although there were some scholars that raised the fundamental differences that exist between the two concepts, the consulted literature often referred to them interchangeably. However, the discussions that were dedicated to these two concepts in this chapter have helped clarify this state of affairs. The next part of this thesis (Part 2) will overview the evolution and current stage of the theoretical bases of the laws governing transboundary watercourses at the global level.

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[322] H. Nasr & A. Neef 'Ethiopia's challenge to Egyptian hegemony in the Nile River basin: the case of the Grand Ethiopian Renaissance Dam' (2016) 4 (21) *Geopol* 969, 989; A.E. Cascão 'Changing power relations in the Nile river basin: unilateralism vs. cooperation?' (2009) *Wat Alt* 2 *(*2) 245, 246-247.

PART II

EVOLUTION AND THEORETICAL BASES OF THE LAWS GOVERNING TRANSBOUNDARY WATERCOURSES

3 AN HISTORICAL OVERVIEW OF THE BIRTH AND EVOLUTION OF THE LAWS AND PRINCIPLES OF THE TRANSBOUNDARY WATERCOURSES.

3.1 Introduction

Chapter 3 sets out to trace back the birth and evolution of the international law and principles that govern transboundary water resources from a historical perspective. The investigations in this chapter will be done with the aim of understanding the legal and non-legal dynamics that have presided in the formation of the laws and principles that govern transboundary water resources at the international level. Such an exercise is essential because it brings this thesis back to the historical, geographical, and legal context of the formation and evolution of the laws and principles in this field of law. The legal discipline being an evolving one, it seems crutial to understand the contextual dynamics that explain the genesis and the evolution of the international law of transboundary watercourses in the past. In the current context, climate change is seen as the driving force that is dictating the design and adoption of a new generation of climate-proofed laws and agreements, it is imposing a paradigm shift in all the sectors of human knowledge, thus representing the next motive of evolution of the law of transboundary watercourses. In such circumstances, it becomes essential to have an outlook on history, and discover how comparable prevailing factors that presided in the past, have contributed to shaping of the current regime. However, it seems necessary to specify that unlike the next chapter (chapter 4), which will concentrate on introducing and discusing the substantial characteristics of the legal framework that defines the international water law, this chapter will focus and all naturally not go beyond the historical aspects thereof. That is the reason why this chapter will comprise five sections. The first section defines water law, discusses its objective, and overwiews some salient water law systems that developed over the years. The second section describes the evolution of states' practice of transboundary water treaties until its emancipation as an autonomous discipline. The third section outlines the particular evolution of transboundary water law in Africa, discusses its current stage and the way forward uner climate change circumstances. Before concluding this chapter, a last section recalls a few key contributions towards the formation of the current international law of the transboundary watercourses.

3.2 Historical backgrounds

This section is concerned with the laws and principles of the transboundary water resources. Yet, the laws and principles of the transboundary watercourses in their present form, are the culmination of a process that began with primitive laws, which were first general laws, before becoming at a later stage the laws of the water sector. That is why it will be advantageous to make a short historical investigation to discover the foundations of this branch of law.

3.2.1 Definition of water law

Water law is generally defined as "a system of enforceable rules that controls the human use of water resources".[323] Caponera[324] refers to water law as "the branch of law that governs water use, administration, and conservation, and further regulates water demand, and controls the consumers' effect on water resources to prevent harmful occurrences such as water pollution". However, "Law" does not refer only to the written, promulgated texts of legal rules; it also includes all forms of regulations of human activities, even the customary.

3.2.2 The early stages of water law

In all times and societies, water has always been shared between different users and uses, on the basis of various laws and principles, which were set in place to be observed for the good of all.[325] Ancient communities and civilisations could not stably settle in locations where there was no enough freshwater for their present and future needs.[326] People migrated continually from place to place until they spotted suitable water flourished locations whereby they decided to settle; they even fought if necessary to conquer a well-watered place that was already occupied.[327] Once established in a place, they established

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[323] Available at *http://www.waterencyclopedia.com/La-Mi/Law-Water.html* , accessed on 7 May 2019.

[324] D.A. Caponera (b) *Principles of water law and administration* 2nd ed (1992), 11.

[325] See generally A.T. Wolf *Sharing water, sharing benefits: working towards effective transboundary water resources management* (2010).

[326] Caponera (b) (note 313 above; 11); Caponera & Nanni (c) (note 147 above; 1-2); S. Salomon water, the epic struggle page 16-18, 24-30;

[327] *Ibid*. Caponera (b).

rules for water use and distribution.[328] The early civilisations were forced to regulate access to water due to both the growing size of the water users and the diversification of its uses.[329] They also set in place sophisticated legal codes to administer the complex networks of water systems, which they created as they developed.[330]

Historical evidence suggests that at first, the laws were general and did not specialise as such on water issues.[331] Records give accounts on several notable water laws that have developed in almost every region of the planet. Nevertheless, under such general law texts, there were provisions that focused on water resources, even if these laws tended to be centred and limited to some fundamental issues, such as water billing, use, protection, or diversion depending on the contexts.[332] Enhanced water law objectives only came with the practice of signing interstate water treaties, which has specific aims, whether in quality or quantity terms.[333]

However, in the Anthropocene, water law is supposed to do two more things than in the traditional past. These are *first*, to "adapt itself" to climate change, and *second*, to create appropriate management and policy contexts for climate change mitigation and adaptation at all levels and sectors, ranging from local, national and international, in the water sector.[334] At this early stage, the transboundary aspect of waters did not yet attract much attention from the lawmakers. The regulation of the use of transboundary water resources between different communities and states only appeared at a later stage.[335]

The analysis of notable water laws that developed in almost every region of the planet confirms the failure of these primitive laws to deal with the transboundary aspect

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[328] *Ibid*. Caponera; J.W. Dellapenna 'The Evolution of Water Law Through 4,000 Years' (2013), 6.

[329] For further descriptions on the early hydraulic civilisations, see Pan American Union *Irrigation Civilisations, a Comparative Study* (1955); See J. Steward 'Evolution and Progress' (1953) *Anthropology Today* 313-326.

[330] Caponera (b) (note 313 above; 11).

[331] Dellapenna (note 317 above; 8).

[332] Caponera (b) (note 313 above; 11).

[333] D. Caponera (a) *The law of international water resources* (1978), 6.

[334] Caponera (c) (note 147 above; 2-3).

[335] Caponera (b) (note 313 above; 11).

of water resources.[336] These laws include the *Code of Hammurabi,* in Mesopotamia, dated 1738 BCE.[337] This piece of law was so well-elaborated that some of its features are still in modern legal codes.[338] Despite such a praised elaboration, the *Code of Hammurabi* was an empty text regarding transboundary waters resources. The famous Hindu *Arthashastra* of 300 BCE was limited too. [339] The *Law of Moses* (*ca.* 1000 BCE) and the *Laws of Manu* (*ca.* 200 BCE), to name only these few, can also be mentioned, in the same order of idea.[340] Despite their limitation, these laws offered the bedding ground for the construction of the future laws of transboundary water resources within their respective contexts.

Three intertwined factors have profoundly contributed to the weaning of the law of transboundary watercourses from being included in the general water laws to becoming a specialised discipline. These factors include the development and systematisation of the states' political boundaries, the recognition by the riparian states of the existence of a community of interest over the waterbody they all shared, and the progressive development of the international law.[341]

Neither a state nor its national sovereignty can be active without the pre-existence of states' political boundaries as discussed earlier.[342] The development of international law brought stability to the principle of state sovereignty and offered to state mechanisms of conflict resolution over shared water resources. In addition, states' practice of treaties determined the progressive design of autonomous regimes to govern shared

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[336] Dellapenna (note 317 above; 8).

[337] See for a translation of the *Hammurabi* Code: L.W. King '*The Code of Hammurabi'* 1910, available at *http://www.yale.edu/lawweb/avalon/medieval/hamframe.htm , accessed on 23 March 2019.*

[338] Section 53 of the *Code of Hammurabi* provides: "If anyone be too lazy to keep his dam in proper condition, and does not keep it so; if then the dam breaks and all the fields are flooded, then shall he in whose dam the break occurred be sold for money and the money shall replace the corn which he has caused to be ruined".

[339] The Hindu *Arthashastra* was a law that provided that the waters were the property of the king. Nevertheless the king authorised a private uses of it, against the payment of a tax, provided the private user maintained properly the water infrastructures. See for more details P. Cullet & J. Gupta 'India: The Evolution of Water Law and Policy' in J. Dellapenna & J. Gupta (eds.) *The Evolution of the Law and Politics of Water* (2009) 21, 26.

[340] R. Laster *et al.* 'Water in the Jewish Legal Tradition' In J. Dellapenna & J. Gupta *The Evolution of the Law and Politics of Water* (2009) 53, 55-59.

[341] See section 4.2.6 below for further details.

[342] See section 2.3.5 above.

water resources.[343] The second contribution came from the recognition by states of the existence of a community of interest over a transboundary waterbody, even if such recognition could not be formalised before the consolidation of state national territories. The third contribution came from the progressive development of the international law, itself synchronised on the multisectoral developments that occurred within the community of independent sovereign states.[344]

3.3 The practice of transboundary water treaties by riparian states

3.3.1 Definition of transboundary water treaties

A treaty, a convention, or accords, an agreement or a protocol, are all interchangeable concepts and constitute the primary sources of rights and obligations at the international level.[345] Article 2 (a) of the 1969 Vienna Convention on the Law of Treaties defines a treaty as:

> "an international agreement concluded between states in a written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation." [346]

Applied to transboundary watercourses, a transboundary water treaty would mean "an agreement on a transboundary watercourse, concluded between its riparian states, in a written form, and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation." A transboundary water treaty can be either bilateral or multilateral. A treaty is bilateral when it involves only two signing states; it is multilateral when it involves more than two signing parties.

In the heart of the definition above lays the idea that a transboundary water treaty intends to create international legal obligations and rights between its signing

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[343] L.B. Chazournes & M. Tignino 'Introduction' in L.B. Chazournes & M. Tignino (eds) *International Water Law Volume I* (2013), xiv.

[344] FAO *The Law of International Water Resources* (1980), 6.

[345] Sands (note 307 above; 126).

[346] Article 2.1 (a) of the 1969 Vienna Convention on the Law of Treaties.

parties.[347] In general, the obligations and rights that are created were existent before the negotiation and signing of the treaty that institutes them. However, it can also happen that a treaty formalises an existing right or obligation, which was already observed by the signing parties, but in unwritten or customary form.[348] Hence the superiority of treaties above the international customs.

Treaties on transboundary watercourses can be negotiated for diverse motives and be assigned diverse functions.[349] Besides the concept "agreements", The UNECE 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes introduces the concept "arrangements", which, in the spirit of the Convention refers to lesser types of agreements, including other forms of formal water cooperation and mutual understandings that Riparian states of a common watercourse may have between them.[350] Therefore, in the sense of the UNECE 1992 Convention, "other arrangements" should not be regarded as "non-committal instruments", especially since several provisions of the Convention refer to it equally as"agreements".[351]

There are around 145 water treaties on the non-navigational uses of the transboundary watercourses that were signed in the period between the years 1874 and

[347] Under Article 2 (1) (a) of the 1969 Vienna Convention on the Law of Treaties, treaties may also be signed with International Organisations; See also Artcile 1 of the 1986 Convention on the Law of treaties between States and international organisations.

[348] G. I. Tunkin *et al. Theory of international law* (1974), 91-113; R. Müllerson 'Source of international law: New tendencies in Soviet thinking' (1989) 83 *AJIL* 449, 501.

[349] P. Wouters *et al. Transboundary Water Cooperation: Principles, Practice and Prospects for China and Its Neighbours* (2018); M. Begg & S. Breheny "Treaty" (2016) 4 (68) *Rev- Inst of Pub Aff* , 16, 16; See Sands (note 307 above; 126); C. Leb *Cooperation in the law of transboundary water resources* Vol. 102 (2013), 20.

[350] When stipulating the obligations of the Parties, Article 9.1 and 9.2; Article 11.1; Article 12; article 13.1; Article 17.2. (b) of the UNECE 1992 Convention refer all to "other arrangements" in an equal scope and weight as "agreements". The formula "Agreements or other arrangements" in the context of this convention "may form a part of decisions or of final documents of an international conference, or of a diplomatic bilateral, or multilateral meeting. Reference to "agreements and other arrangements" See UNECE Guide to Implementing the Water Convention (2013), 64.

[351] UNECE *Guide to Implementing the Water Convention* (2013), 64.

1996. Hamner & Wolf[352] found that 86 percent of those agreements were bilateral, whereas 14 percent of them were multilateral. Conca *et al.*[353] came to a similar conclusion as they noticed that bilateral treaties were the most common type of water agreements in international river basins worldwide.

3.3.2 The early state's practice of transboundary water treaties

The transcending of a state's territorial boundaries by watercourses has often resulted in complex webs of legal, environmental, political, and security concerns. If already in the ancient times the transboundary character of some watercourses was a source of problems regarding water management, the situation seems to have not significantly evolved ever since.[354] The root of the very English word "rival" is the Latin word "*rivals*," which initially meant: "using the same river" (*rivus*).[355] Indeed, the practice of water treaties have been contributory in the prevention and settlement of water disputes between states and communities, from times that go as far as around 3000 BC,[356] nevertheless, there are still many issues to be settled, especially at the current epoch.

The oldest agreement in the record on transboundary waters is the treaty between the two Sumerian city-states of Lagash and Umma, which was signed to end a water disagreement along the Tigris River.[357] The law to regulate the transboundary water resources has been developing in tandem with the evolution of the human society, both in natural, economic, and political terms.

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[352] J. Hamner & A. Wolf 'Patterns in international water resource treaties: The Transboundary Freshwater Dispute Database' (1998) 1997 Yearbook *Col J of Int'l Env L&Pol,* 157, 158.

[353] Conca *et al.* 'Global Regime Formation or Complex Institution Building? The Principled Content of International River Agreements' (2006) 2 (50) *Int Stu Quart* 263, 272.

[354] UNEP (a) (note 12 above; 1).

[355] C. Sadoff & D. Grey 'Beyond the river: The benefits of cooperation on international rivers' (2002) 4(5) *Wat Pol* 389, 391.

[356] P. Gleick 'The world's water: The biennial report on freshwater resources 2002-2003' (2003), 194-208; Conflict is not to be restrictively understood as the presence of acts of violence, but rather as the presence of disagreements at various stages.

[357] Information available at *http://www.worldwater.org/conflict/list/* accessed on 15 August 2019.

The industrial boom of the nineteenth century propelled international trade and commercial exchanges, which in turn fuelled the intensification of the navigation industry. As a result, a growing number of people and goods travelled by waterways from state to state, thus creating the need to set in place some regulatory framework for the waterways, which was to be observed at the international level.[358] The regulatory framework had to apply to the water users also, and favour formal cooperation around the shared waterways, to accompany the growing activities.[359] Authors such as Biswas[360] found in this situation the explanation as to why the first attempts to regulate international rivers were focused on navigation.

The European continent was the only advanced continent in regulating waterways in this manner. Indeed, besides international trade, the colonial adventure must have contributed to stimulating the Europeans to adopt these water treaties. Nevertheless, the first modern treaties on transboundary waters were adopted in the space of time which is between the early 19th century and the mid-19th century.[361] These treaties were signed between the riparian countries of the Rhine River[362] and aimed at establishing navigation rules, fish harvests division, and water withdrawal along the Rhine River.[363]

Some notorious early European contributions towards the law of shared watercourses include the Final Act of the Congress of Vienna, Austria, of 1815, the 1885 Berlin Final Act on the Congo and Niger Rivers, and the 1921 Barcelona Convention and Statute on the Regime of Navigable Waterways of International Concern.[364] The 1815 Vienna treaty established the freedom of navigation principle and the primacy of the navigation over the other users of the transboundary watercourses, the 1885 Berlin Final Act extended the principle of freedom of navigation on Congo and Niger Rivers, which are

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[358] L. Caflisch 'Règles générales du droit des cours d'eau internationaux' (1989) 219 *Rec des cours* 104, 105; Biswas (note 171 above; 13-14).

[359] M.A. Salman (d) *The World Bank policy for projects on international waterways: an historical and legal analysis* (2009), 10.

[360] Biswas (note 171 above; 13-14).

[361] Salman (d) (note 348 above; 10).

[362] See details of the Rhine River in Section 8.3 below.

[363] H. Cooley & P.H. Gleick 'Climate-proofing transboundary water agreements' (2011) 4 (56) *Hydr Sc J'l* 711, 718.

[364] See section 6.2.2 below for details concerning these 3 treaties.

two African waterways.[365] The 1921 Barcelona Convention is also mentioned as an attempt to codify the principle of freedom of navigation.[366]

3.3.3 The transboundary water treaties in the late 1940s and early 1950s

Despite all the above developments, the formation of the international law on the non-navigational uses of international watercourses would have to wait until the late 1940s and early 1950s, after states practices in the field matured enough to inform the international law for codification in this field.[367] A close examination of some transboundary water conventions signed during this period suggests that this body of law emerged from principles that were the reflection of a set of earlier substantive and procedural rules about sharing transboundary water resources.[368]

The International Law Association (ILA)[369] and the Institute of International Law (IIL)[370] which are two bodies of law scholars have significantly contributed towards the advent of the international law of transboundary water resources. The ILA began to work on international water law in 1954, after the establishment of what was called the

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[365] *Ibid.*

[366] *Ibid.*

[367] Salman (d) (note 348 above; 10); C.B. Bourne 'The Primacy of the Principle of Equitable Utilisation in the 1997 Watercourses Convention' (1997) 35 *Can Yearb of Int L* 215, 215.

[368] Hoffmannn & McIntyre (note 255 above; 31) .

[369] The International Law Association [hereinafter ILA] was founded in 1873. Its objectives is "the study, clarification and development of international law, both public and private, and the furtherance of international understanding and respect for international law." The ILA has a consultative status in many UN specialised agencies with membership opened to all international lawyers. Further information on the ILA available at http*://www.ila-hq.org/* , accessed on 12 June 2019.

[370] The Institute of International Law [hereinafter IIL] is a scientific, private, non official association that was established in 1873 with the objective of promoting the progress of international law. It consists of selected members worldwide. It made its first contribution in the field of watrer law with the *Resolution of Heidelberg* of September 9, 1887, on International regulation on navigation.See *https://www.ili.org/*, accessed on 13 May 2019.

"Committee on the Uses of the Waters of International River".[371] The contributions of these two bodies of experts are discussed below.[372]

References to the principles of freedom and primacy of navigation declined in the 1950s and 1960s and eventually stopped in states practice of transboundary water treaties.[373] Yet, the mechanisms of international law that were in place in that period failed to identify and adopt some of the emerging rules in order to regulate states' non-navigational uses of international watercourses.[374] In the absence of an international agreement on transboundary water resources, and the lack of some recognised and dominant principles in the field, there was a legal vacuum that was felt by states, and which contributed to feeding a significant volume of transboundary water disputes, for which the international mechanism of dispute resolution was not adequately equipped.[375]

After World War II, the global trend in transboundary water laws turned towards two things. *Firstly*, the effort to extend the law to include the various other forms of use of international water resources; *secondly*, the approach to commonly manage transboundary water resources.[376] The non-navigational uses of international waterways did not attract much attention from the field of international law and politics.[377] That is the reason why, after the decline of the principle of freedom of navigation on international waterways, closer attention had to be put on the non-navigational uses in order to equip the international law community with adequate instruments to deal with this specific issue.

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[371] For further details on the contributions of the ILA in this field, *see* generally C. Bourne *The International Law Association's Contribution to International Water Resources Law* (1996) 36 *Nat Res J* 155, 156; The Committee on the Uses of the Waters of International Rivers was also known as the "Rivers Committee", see M.A. Salman (b) 'The Helsinki Rules, the UN Watercourses Convention and the 2004 Berlin Rules: perspectives on international water law' (2007) 4 (23) *Wat Res Dvpment* 625, 628.

[372] See section 3.5.4 below.

[373] McCaffrey (a) (note 145 above; 180-181).

[374] Salman (d) (note 348 above; 13).

[375] McCaffrey (a) (note 145 above; 181-184).

[376] Caponera (b) (note 313 above; 6).

[377] Salman (d) (note 348 above; 13).

There were a few arbitral and judicial decisions already awarded by some International Justice Bodies.[378] However, these arbitral and judicial decisions only covered some aspects of the non-navigational uses of international watercourses. Besides, they were unclear and sometimes contradicting each other. [379] Some water conventions that applied emerging rules and principles were in place, but signed by a few countries only, implying a limited treaty authority. Issues these treaties addressed were also limited in most of the cases.[380]

Allouch[381] noticed that diverse non-navigational uses of shared watercourses were already addressed by many pieces of law during the 1950s and 1960s, even if sometimes, they were addressed only in a marginal way, through issues such as flood protection, water allocation, or water quality.[382]

3.3.4 The formation of the doctrines on transboundary water resources

Four major doctrines have progressively developed around the rights and duties of the states regarding the non-navigational uses of international rivers, namely the absolute territorial sovereignty, the absolute territorial integrity, the limited territorial sovereignty, and the community of interest doctrine.[383] These doctrines were either based on state practice in the field of water law or on the works of scholars and experts in the field.[384] The next chapter (chapter 4) is the part of the thesis which will provide much details on these doctrines, despite a brief overview of the genesis thereof which is outlined in this section.

The first doctrinal opinion to be expressed concerning transboundary watercourses was the doctrine of *absolute territorial sovereignty*, also known as the

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[378] *Ibid*.

[379] *Ibid*.

[380] *Ibid*.

[381] J. Allouche *Water Nationalism: An Explanation of Past and Present Conflicts in Central Asia, the Middle East and the Indian Subcontinent?* (Unpublished Ph.D thesis, University of Geneva, 2005), 33.

[382] See for instance the "Draft Convention on the Industrial and Agricultural Use of International Rivers and Lakes of Rio de Janeiro", adopted on September 1, 1965, under the Organization of American States; see also the "African Convention on the Conservation of Nature and Natural Resources" of Algiers, adopted on September 15, 1968, under the Organization of the African Unity; The 1964 agreement concerning the River Niger Commission and Navigation and Transport on the River Niger.

[383] For further details on the doctrines of international water law, see section 4.2 below.

[384] McCaffrey (a) (note 145 above; 181-184).

Harmon Doctrine.[385] This doctrine was worded for the first time in 1895 by M. Harmon, who was at that time the Attorney General of the United States.[386] It claimed complete liberty of a riparian state to utilise as he needs the portion of a transboundary watercourse that passes through its territory, regardless of the consequences to the other riparian countries. It also claimed that impactful water utilisations could be undertaken even without prior consultation with a downstream country, even if this country was likely to be negatively affected.[387] The Harmon doctrine was an intransigent expression of state sovereignty, according to which a State is so much in control of its territory and its natural resources, that it feels allowed to use them in whatever way it pleases the state.[388]

For the record, Mexico and the USA are both co-riparian states to the Rio Grande River.[389] After a series of water diversions undertaken by the USA from the Rio Grande River to irrigate the states of Colorado and New Mexico, the government of Mexico complained that those US diversions reduced significantly the inflow of water in its territory. The Mexican communities downstream the Rio Grande River, on the other side of the boundary, became particularly affected. The Mexican communities began using the waters of the Rio Grande hundreds of years before the USA diversion occurred.[390] Mexico demanded that the two countries signed an agreement on the waters of the Rio Grande River to avoid future unilateral undertaking on the shared waters from either country, declaring "incontestable" its right to continue having access to the same amounts of waters from the Rio Grande as per history.[391]

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[385] See section 4.2.2 below.

[386] Caponera (b) (note 313 above; 7); McCaffrey (a) (note 145 above; 77-104).

[387] M.M. Rahaman 'Principles of International Water Law: Creating Effective Trans-boundary Water Resources Management' (2009) 1 (3) *Int'l J. Sust Soc* 207, 209.

[388] Caponera (b) (note 313 above; 7); S.C. McCaffrey (g) 'The Harmon doctrine one hundred years later: buried, not praised' (1996) 36 *Nat Res J'l*, Vol. 36 549, 549.

[389] Map of the Rio Grand River, available at *https://www.americanrivers.org/river/rio-grande-river/* accessed on 18 July 2019.

[390] McCaffrey (a) (note 145 above; 113) quoting Mr. Romero, a mexican minister to the US Secretary of State Richard Olney.

[391] *Ibid.*

After analysing Mexico's claim, the then US Secretary of State requested from the US Attorney General a legal opinion as to whether the USA indeed violated Mexico's rights as per International Law.[392] Harmon, who was the US Attorney General replied to the US Secretary of State, denying that the general principles of international law imposed on the USA any obligation to restrict its use of the portion of the Rio Grande River which was situated within the USA territory.[393] For Harmon, such an exercise of a sovereign right could be maintained irrespective of whether it caused adverse effects downstream in Mexico. Harmon claimed that "the rules, principles, and precedents of international law impose no liability or obligation upon the United States."[394] Moreover, Harmon added:

> "... the fundamental principle of international law is the absolute sovereignty of every Nation as against all others within its own territory ... all exceptions, therefore, to the full and complete power of a Nation within its own territory must be traced up to the consent of the Nation itself. They can flow from no other legitimate source… The immediate, as well as the possible consequences of the right asserted by Mexico, show that its recognition is entirely inconsistent with the sovereignty of the United States over its national domain." [395]

So eventually concluded:

> "to yield to the Mexican claim would be entirely inconsistent with the sovereignty of the United States over its national domain."[396]

Birnie[397] and many others are convinced that the Harmon Doctrine was not reflexive to the International water law, despite its little development at that time. Emphasising on how

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[392] McCaffrey (a) (note 145 above; 77-104).

[393] McCaffrey (note 377 above; 549); Caponera (b) (note 313 above; 7).

[394] A.P. Lester 'River pollution in international law' (1963) *57*(4) *Am Jof Int'l L* 828, 831; See opinion of Attorney General in ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 90.

[395] *Ibid*. ILC.

[396] *Ibid*.

[397] P. Birnie & A. Boyle *International Law and the Environment* (2002), 301; M.A.S. Salman & K. Uprety *Conflict and Cooperation on South Asia's International Rivers: A Legal Perspective* (2002), 12.

irrelevant the Harmon Doctrine was, Birnie[398] went on reporting an additional part of the statement of M. Harmon:

> "The fact that the Rio Grande lacks sufficient water to permit its use by the inhabitants of both countries does not entitle Mexico to impose restrictions on the USA which would hamper the development of the latter's territory or deprive its inhabitants of an advantage with which nature had endowed it and which is situated entirely within its territory. To admit such a principle would be completely contrary to the principle that the USA exercises full sovereignty over its national territory".[399]

However, the *absolute territorial sovereignty* doctrine was followed by the *absolute territorial integrity* doctrine, which, in the view of many scholars,[400] was conceived in order to counterbalance the Harmon doctrine. It seems easy to notice that each of these two doctrines reflected the claims and counterclaims of either downstream riparian states or the upstream ones over a successive transboundary river. The "absolute territorial sovereignty" doctrine sought to favour upstream riparian states, whereas the "absolute territorial integrity" doctrine sought to favour downstream riparian.[401]

In general, the *absolute territorial sovereignty* doctrine is seen as the first step towards the emergence of the customary international law of transboundary watercourses.[402] For Tarlock,[403] the international custom of transboundary watercourses developed as a replica to block the *absolute territorial sovereignty* doctrine emitted by Harmon, which for the author, after its expression, quickly found its place in the graveyard instead of prospering.

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[398] *Ibid*. Birnie & Boyle at 332.

[399] *Ibid*.

[400] O. McIntyre (a) *Environmental protection of international watercourses under international law* (2016), 78; A. Earle *Transboundary water management: Principles & practice* (2013), 63; McCaffrey (a) (note 145 above; 77-104).

[401] S.C. McCaffrey (d) 'Intertwined general principles' in S.C. McCaffrey *et al*. (eds) *Research Handbook on International Water Law* (2019), 85; *Ibid*. Earle; See Section 4.2 below for further details.

[402] Bourne (note 360 above; 215).

[403] D. Tarlock 'International water Law and climate disruption' in S.C. McCaffrey *et al*. (eds) *Research Handbook on International Water Law* (2019), 189.

3.3.5 The development of the principles of transboundary water law

Most of the first modern rules of law touching international watercourses developed to protect transboundary rivers from pollution and over-extraction.[404] These rules were generally adopted in an ad-hoc basis, to respond to imminent concerns regarding shared rivers, lakes, or other water bodies.[405] Principles applicable to the law of transboundary watercourses were primarily found in bilateral treaties (in reflection to states practice in the field), in domestic laws and decisions from international tribunals, such as the PCIJ and the ICJ, and in some international arbitration awards applicable to the sector. [406] The Works of public and private organisations such as the ILC, ILA, IIL, and IDI, produced relevant non-binding instruments, including the 1966 Helsinki Rules, the 1972 Stockholm Declaration, the 1992 Rio Principles, and the ILA's non-binding rules on water pollution in international basin drainages of 1982.

Even though all of these institutions and instruments made significant contributions in assembling the modern emerging principles of international water law, only some are regarded as having provided the foundational steps towards the constitution of the modern principles of the law of transboundary watercourses.[407] The PCIJ's judgement regarding the *River Oder case* is one of these foundational steps. In the *River Oder case*, pronounced as early as in 1929, the PCIJ ruled in favour of the community of interest over a shared watercourse and held that the use of both the flows and the river that have an international status were subject to international law.

> "This community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian states in the use of the whole course of the river and the exclusion of any preferential privilege of anyone riparian state in relation to the others."[408]

Although taken from a navigational perspective, the PCIJ's decision in the *River Oder* case was the consecration of the community of interest of the riparian states in a shared

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[404] Sands (note 307 above; 459).

[405] *Ibid*. at 461.

[406] *Ibid*.

[407] *Ibid*. at 462; See 60th Report of the ILA (1983), 535.

[408] PCIJ The *Oder River Case*, PCIJ Ser. A, No. 23 (1929), 27.

transboundary water system. For the tribunal, such a community of interest had to be regarded as the basis of a common legal right to all of the riparian states of a transboundary river. 70 years later, the ICJ revisited the same paragraph, and extended its scope to include the non-navigational uses of the international watercourses, upholding that

> "modern development of international law has strengthened this principle for non-navigational uses of international watercourses as well, as evidenced by the adoption of the convention of 21 May 1997 on the Law of the Non-Navigational Uses of International Watercourses by the United Nations General Assembly."[409]

The approach concerning the principles for the non-navigational uses of international watercourses as reflected in the above paragraph by the ICJ received wide support from states. They acknowledged in the majority that waters on which there exists "a common legal right" are not in a position of being unilaterally used by one state, to the extent of preventing or limiting the use that could be made by the other riparian states.[410]

The PCIJ's pronouncement in the *River Oder* case has consecrated a legal principle that subjected states to the obligation to exchange information, cooperate, and consult each other to reach adequate solutions in a project that is likely to affect either the quality or the number of international rivers.[411] The principle of exchange of information and cooperation was already reflected in the Geneva Convention of December 9, 1923.[412] The *Lake Lanoux* case which also applied the community of interest principle brought in this principle some new understandings as the ICJ held that

> "France is entitled to exercise her rights, she cannot ignore Spanish interests. Spain is entitled to demand that her rights be respected and that her interests be taken into consideration"[413]

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[409] The *Gabčíkovo-Nagymaros* case 1997 (*Hungary vs Slovakia*) Judgment, ICJ Reports (1997), 7 & 56.

[410] *Ibid*. ICJ; Sands (note 307 above; 462).

[411] *Ibid*. Sands at 463.

[412] See Articles 2 and 3 of the Convention relating to the Development of Hydraulic Power affecting more than one State and Protocol of Signature of December 3, 1923. Available at *https://www.internationalwaterlaw.org/documents/intldocs/hydraulic_power_conv.html*, accessed on 12 May 2019; See section 4.3.5.1 below.

[413] Sands (note 307 above; 463); The Arbitral Tribunal was set up under an agreement of November 19, 1956, based on an Arbitration Treaty of July 10, 1929, between France and Spain. For further analysis on the *Lake*

Despite the limited state of the customary law of transboundary water resources that characterised that epoch, the ICJ's award designated the limits that international law imposes on states concerning the use of the natural resources that are shared between many states. It has further shown the limits that exist on the procedural obligations associated with the substantive rules of environmental conservation and protection.[414] In a nutshell, the ICJ's discussed awards contributed to the formation and consolidation of several principles of the international law of the transboundary water resources.

Both the non-binding instruments, treaties, and the jurisdictional awards outlined above constituted the effective background of legal rules, principles, and concepts on which could lean the ILC for the codification of the international law of the non-navigational uses of international watercourses. The 1997 UNWCC which will be introduced next is the product of the ILC's efforts of codification in this field. Before the ILC's efforts, there was no states' formal attempt of codification. Indeed, there were works done by the ILA and the IIL, which are regarded as attempts to codify the international law in this field. However, being that both organisations were not given any mandate by the states to do so, their contribution can not be regarded as a formal codification. The ILC's work was formal because it received states' mandate to do so, through the UN General Assembly.[415]

The next section, which discusses the genesis of the international law of transboundary watercourses will rather be an account of the genesis of the 1997 UNWCC.

3.3.6 Genesis and development of the international law of the Non-navigational Uses of the International Watercourses

The rules and principles of international law that are applicable to the transboundary watercourses as they appear in the 1997 UNWCC are the outcomes of a lengthy process, whose genesis can be traced back to the second half of the twentieth century.[416] At the dawn

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Lanoux case, see J. G. Lammers *Pollution of International Watercourses: A Search for Substantive Rules and Principles of Law* (1984), 508-517.

[414] *Ibid*. Sands at 464.

[415] See further details in section 3.5.4 below.

[416] Tarlock (note 392 above; 189).

of the 20th century, the non-navigational uses of the international watercourses grew in relevance in the field of International Law due to a series of factors as discussed above.[417] To such growing water worries added the global security concerns of the post-World War II (1945) period, as also an increasing number of neighbouring states became conflictual over shared water resources.[418] The growing number of conflicts over shared water resources was partially nurtured by the absence of a regulatory mechanism in the field at the international level.[419] Eventually, all the above issues constituted an alarm bell that called for the adoption of an international regime in the field of the non-navigational uses of international water resources.[420]

In 1959, Bolivia made a proposition to the UNGAS requesting the UN Secretary-General to examine the legal problems attached to the use and consumption of international rivers.[421] In 1963, the UN Secretary-General produced a report which pushed the UNGAS to recommend to the ILC, in 1970, to study the progressive development and codification of the law of the non-navigational uses of international watercourses.[422]

Still in 1970, before the UNGAS' recommendation to the ILC was issued, Finland submitted a project of resolution to the UNGAS, suggesting that the 1966 Helsinki Rules may be considered as a model for the international law of transboundary watercourses.[423] Finland's project was rejected. The major obstacle to Finland's project was the fact that the 1966 Helsinki Rules were produced by a non-official organisation,

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[417] Tanzi & Arcari (note 279 above; 6-7); See section 2.2. above for historical details of the 1997 UNWCC.

[418] Examples include the disputes between Pakistan and India over the Indus River, Egypt and Sudan concerning the Nile River, Israel and its Arab neighbours over the Jordan River, and also the USA and Canada over the Columbia River. See B. Bošnjaković *'Negotiations in the context of international water-related agreements'* (2003) 8 In *Tech docs in hyd, 5.*

[419] *Ibid.*

[420] Tanzi & Arcari (note 279 above; 6-7).

[421] Preliminary Studies on the Legal implications of the use of International Rivers (UNGAS Resolution 1401 (XIV), 21 November 1959); E. Brown-Weiss *et al.* Fresh Water and International Economic Law (2005).

[422] E.S.Wildberg 'The 1997 International Watercourses Convention-background and Negotiations' (2002) Working Paper, 16; Progressive development and codification of the rules of the international law of the transboundary watercourses, decided under UN General Assembly Resolution 2669 (XXV). available at *https://www.un.org/ga/search/view_doc.asp?symbol=A/Res/2669%28XXV%29* , accessed on 21 June 2019.

[423] Biswas (note 171 above; 13-14).

which had no mandate to represent the states, and did not associate the states during the preparation of the so-called Rules.[424] The other motive of rejection was the fact that the 1966 Helsinki Rules had adopted the drainage basin approach,[425] which is synonymous to the river basin concept, that was already rejected by states as discussed earlier.[426]

The rejection of Finland's project was followed with a series of discussions among the UN state members concerning the rules of international law in the field of the non-navigational uses of transboundary watercourses.[427] On December 8, 1970, the UNGAS voted a resolution recommending the ILC to "undertake the study of the law of the non-navigational uses of international watercourses, with the view of its progressive development and codification".[428] The 1970 UN Resolution launched the codification by the ILC in the field of the international law of the non-navigational uses of international watercourses, pursuant to Articles 1 and 2 of the UN Charter.[429]

It took the ILC approximately twenty years to produce a draft convention on the law of the Non-Navigational Uses of Transboundary Watercourses, which draft the ILC would discuss at its forty-third session, held from April 24 to July 19, of the year 1991.[430]

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[424] *Ibid*.

[425] See section 2.3.2 above.

[426] Biswas (note 171 above; 13-14).

[427] McCaffrey (a) (note 145 above; 36).

[428] See ILC 'Summaries of the Work of the International Law Commission, the law of the non-navigational uses of international watercourses',
available at *https://legal.un.org/ilc/summaries/8_3.shtml*, accessed on 20 August 2019.

[429] Articles 1 and 2 of the UN Charter provides: "The purposes of the United Nations are: 1. To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means, and in conformity with the principles of justice and international law, adjustment or settlement of international disputes or situations which might lead to a breach of the peace; 2. To develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, and to take other appropriate measures to strengthen universal peace; 3. To achieve international cooperation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion; and 4. To be a centre for harmonizing the actions of nations in the attainment of these common ends." See Articles 1 and 2 of the United Nations Charter.

[430] ILC *Yearbook of the International Law Commission*. Vol. 1 (2000); See the ILC's 43rd session.

The period post-1991 was one of the most intense for the ILC's codification mission because it was marked with stormy debates on the ILC draft report. Nonetheless, the ILC would produce a final format of the law of the Non-Navigational Uses of Transboundary Watercourses, which the UNGAS would finally adopt on May 24, 1997.

One of the bones of contention between the states that were engaged in the discussions of the ILA was the inclusion of the river basin concept in the final format of the convention on the law of the non-navigational uses of international watercourses. Discussions in this regard began almost two decades earlier. It was in 1974, that the ILC sent a questionnaire to all the United Nations member states, soliciting their views on the river basin concept. By 1982, the 32 countries that replied,[431] did not agree on the appropriateness of using the river basin concept in the upcoming convention. Half of the countries were supportive of the river basin concept, whereas the other half was either opposed or undecided. Amidst such opposing views, the ILC decided to start with the formulation of the general principles to govern the non-navigational uses of transboundary water resources, and thereafter discuss the controversial river basin concept. The ILC would eventually adopt the watercourse concept instead of the river basin.[432]

In 1994, after 20 years of work and 15 reports produced, the ILC adopted its first draft entitled: "Draft of the law of the Non-Navigational Uses of International Watercourses".[433] Based on the ILC's 1994 Draft Articles, the UNGAS then decided to convene an *ad hoc* working group, whose aim would be to negotiate a Convention on the Law of the Non-navigational Uses of International Watercourses.[434] The ILC's document had 32 draft articles. For many scholars, the ILC Draft Articles built upon the doctrine of limited territorial sovereignty.[435] As per international law practice, the ILC Draft Articles were forwarded to the UN member states for comments and observations.[436] In July 1994,

[431] Biswas (note 171 above; 13-14).

[432] *Ibid*.

[433] ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994).

[434] *Ibid*.

[435] Tanzi & Arcari (note 279 above; 6-7).

[436] *Ibid*. at 41; UN *The Work of the International Law Commission* 8th Ed, Vol I (2012), 46-70.

following analysis on the states' feed-backs, crucial changes were made on the 1991 Draft Articles to meet states' recommendations.[437]

At this point, the Sixth Committee of the UNGAS took over the drafting task from the ILC and convened an ad-hoc working group tasked with the elaboration of a Framework Convention for the non-navigational uses of international watercourses, based on both the ILC Draft Articles and the written comments and observations from States.[438] The working group met in 1996 and 1997, shortly before the adoption of the 1997 UNWCC. After two years of negotiations, the final version of the 1997 UNWCC was submitted to the UNGAS for adoption. [439]

Upon a request made by Turkey, the UNGAS called for a vote to adopt the 1997 UNWCC, on May 21, 1997, in New York, USA, under resolution A/RES/51/229 of the UNGAS. Out of 133 voting states, 103 were in favour, 27 states abstained, whereas three others were opposed to the convention.[440] The supporting states included Bangladesh, Finland, Jordan, Mexico, Nepal, USA, Slovakia, and Syria, whereas the opposing states included Burundi, China, and Turkey, and the abstentions came from countries such as Egypt, Ethiopia, Rwanda, India, Israel, and France, who subsequently joined the Convention.[441]

Years after the adoption of 1997 UNWCC, the increasing water demand aggravated by the steady drop in the *per capita* water availability in many parts of the world challenged seriously all the developments that already took place in the field of the law of international water resources.[442] The Water Resources Committee of the ILA officially recognised that the changes in the context of the international water law were so profound

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[437] *Ibid*. Tanzi & Arcari; Changes such as the addition of Article 33, which provides for disputes settlement.

[438] Wildberg (note 422 above; 18); Rieu-Clarke (note 277 above; 10).

[439] See for note 161 above for further details on the UNGASS Sixth Committee.

[440] The official vote recorded 103 votes in favour. However, Belgium, Fiji and Nigeria stated subsequently their intention which was a vote in favour of the Convention, thus bringing the number of the supporting parties to 106. See for more details Rieu-Clarke (note 277 above; 37).

[441] It seems crucial to consider the positions of Rwanda and Burundi. Rwanda has abstained from signing the Convention whereas Burundi has opposed the convention. Both countries are included in the Congo River Basin. See section 6.4. for further reflections; See annexe 3: list of Countries parties to the 1997 UNWCC.

[442] S.M. Salman (b) (note 358 above; 635).

that it became justified to revise both the 1966 *Helsinki Rules* and the supplemental rules thereof.[443]

Scholars often advance three reasons to explain what led the ILA to analyse the state of the customary international water law after the adoption of the 1997 UN Water Convention.[444] *First*, the absence of any agreement between the riparian states of all the most disputed international watercourses. *Second*, the slow speed of states ratification of the 1997 UNWCC, and the need to continue applying customary international law until its entry into force.[445] *Third*, interrogations grew among the States at the global level as to whether the 1997 UNWCC did accurately reflect the customary international law in the field of transboundary water resources.[446]

Gathered in Berlin in August 2004, the ILA adopted (almost four decades later) an update to the 1966 Helsinki Rules, referred to as the "2004 Berlin Rules". They aimed at *first*, providing a clear, coherent, convincing, and compelling statement of the customary international law that applies to the waters of the international river basins. *Second*, deciding on the extent to which the customary international law applied to the waters that were situated entirely within a single state. *Third*, to incorporate or reflect a progressive character of the law that takes into account the emerging problems of international water management.

On the view of Biswas,[447] played a noteworthy moral and authoritative role during the time the 1997 UNWCC did not enter into force, despite the existence of a dissenting opinion from some members of the ILA Water Resources Committee (WRC) that did not agree with four aspects of the 2004 Berlin Rules. The problematic aspects

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[443] *Ibid.*

[444] A. Tanzi 'The UN Convention on International Watercourses as a Framework for the Avoidance and Settlement of Waterlaw Disputes' (1998) 11 *Leid J. Int L,* 441; M. Fitzmaurice 'Convention on the Law of Non-Navigational Uses of International Watercourses' (1997) 10 *Int L* 501; R. Rahman 'The Law of the Non-Navigational Uses of International Watercourses: Dilemma for Lower Riparians' (1995) *Ford Int LJ* , 9.

[445] See section 4.4.5 below for further details.

[446] *Ibid.*

[447] Biswas (note 171 above; 16-17).

included *i.* the scope of the study, *ii.* the effect of inclusion of national waters, *iii.* The treatmenet of the principle of equitable utilisation, *iv.* The inappropriate use of "shall".[448]

These three sets of rules in the space of nearly half a century have marked the genesis and the evolution of the law that governs the transboundary water resources. In addition, these rules have shown both a rapid evolution of the context of the law of transboundary water resources, which will undoubtedly need further adjustments of the legal framework thereof, due to the ongoing and the predicted challenges of climate change on the transboundary water resources.[449] The 1992 UNECE Water Convention which is discussed in Section 4.5 below deserves being also mentioned here, being an instrument whose influence is increasing at a global scale.

3.3.7 Transboundary waters law and principles under climate change

The main contemporary challenge faced by international water law is climate change. The existing international customs and water law principles developed over the last centuries, whereas the current climate change did not yet pose a threat to shared water resources. States' treaty practices developed and matured in the absence of any climate disruption as it is the case currently. Historical states treaty practices often approached water resources from a stable perspective, as a resource beyond vulnerability. Today, climate change has changed this situation, and water resources have become one of the most vulnerable assets on the planet.[450] That is the reason why Tarlock,[451] argued that some rules of international water law will need a fundamental review because of climate change.

Thinking on the adaptation to climate change at river basin, Tarlock[452] identified two major challenges, which are mainly of a legal order. The first is the practice by states of unilateral developments on shared watercourses, and the second is the issue of

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[448] ILA Berlin Conference Report (2004), 2; The "2004 Berlin Rules" were opposed by some members of the ILA Water Resources Committee. Details on their opposed views are found in: https://www.internationalwaterlaw.org/documents/intldocs/ILA/ILABerlinRulesDissent2004.pdf (Accessed on 12 September 2020).

[449] Caponera & Nanni (c) (note 147 above; 1-2).

[450] Ansink & Ruijus (note 149 above; 250); USGCRP (note 149 above).

[451] Tarlock (note 392 above; 198-200).

[452] *Ibid.*

state sovereignty over natural resources. Allouche[453] qualified earlier the second challenge referred to by Tarlock as water nationalism. Climate change impacts on water resources will require the incorporation in treaties on transboundary waters some elements of adaptation to changing conditions, in order to create flexibility in the treaty. As it will be discussed below,[454] treaty flexibility contributes to the responsiveness of a regime to the impact that climate change may have on waters. The absence of flexibility mechanisms in transboundary water treaty is likely to affect treaty resilience and applicability.

From a historical perspective, the genesis and evolution of the law of transboundary water resources have shown both a progressive development and a somewhat capacity to adapt to changing contexts. The shift of interest that occurred earlier from the exclusivity of the navigational considerations to the inclusion of the non-navigational is a piece of evidence to this. Whereas the early treaties on shared waters dealt with issues such as boundary demarcations and navigation, the latest treaties became more inclined towards the non-navigational uses of shared waters. Themes relating to water developments, conservation and protection in a context of environmental degradation were all included.[455] The theory of sustainable development was also incorporated in transboundary water treaties when the environmental parameters required to do so.

Such a capacity to evolve and adapt as it was shown in the past is much needed at present, and will probably continue to be needed in the foreseeable future because of climate change.[456] Besides the significant changes that have already begun to occur, growing debates are underway concerning the scopes and the extent of the changes that are to take place to accommodate a hardly predictable phenomenon such as climate change, in the law of transboundary water resources, which is a field that requires sufficient predictability. As puts Zmak[457] "We do not know how climate change will reshape

[453] Allouche (note 370 above; 33).

[454] See chapter 7 below.

[455] UNDP (a) (note 150 above; 14).

[456] See section 2.2.6 above.

[457] E.J. Zmak *Weathering Climate Change: Provisions for Climate Change Resiliency in Transboundary River Treaties* (Unpublished Masters thesis, University of Denver, 2017), 11.

civilisation's relationship with rivers, though we know it will. And, as it modifies the hydrologic system, pre-existing water agreements must modify accordingly."

From a societal perspective, Solomon[458] noticed that most societies did not yet modify their patterns in terms of water use and consumption, in order to match the current climate-related constraints. Undoubtedly, the question of societies modifying their water use patterns should be approached differently, being that societies are differently challenged. It follows from such variance in climate change impacts that societies would differently respond to the phenomenon. Societies that will suffer floodings and those that will suffer droughts for instance will not respond to the phenomenon in an even way. Therefore, the question should be posed in terms of "what are societies already doing to adapt to the growing impacts of climate change on their water resources?"

In this respect, scholars, such as Salomon[459] and Drieschova & Eckstein[460] found several ways in which states and societies usually addressed the challenges posed by climate change on the transboundary water resources. Each of these practices is outlined in table 2 below. They represent a potential new wave of evolution for the law of transboundary water resources.

Table 2: States practice to respond to the challenges of climate change on water resources

Salomon's approach	Drieschova & Eckstein's approach
Not acting, and waiting for nature to self-regulate.	Ignoring the uncertainties.
Adopting water-efficiency methods.	Developing a complete contracts approach.
Transfering waters from remote sources.	Limiting uncertainties with different technics.
Exploit groundwaters.	Using open-ended approaches.

Source: S. Solomon and Drieschova & Eckstein[461]

[458] S. Solomon *Water: The epic struggle for wealth* (2010), 368.

[459] *Ibid*.

[460] A. Drieschova & G. Eckstein 'Cooperative Transboundary Mechanisms' in J.C. Sanchez & J. Roberts (eds) *Transboundary WaterGovernance: Adaptation to Climate Change* (2014), 53.

[461] Solomon (note 458 above; 390); Drieschova & Eckstein (note 446 above; 53).

In a discussion on the fast emergence of new challenges associated with climate change, in the field of transboundary water resources, Peterson-Perlman[462] recommended that riparian countries may build up institutional capacities, and be anticipative with conflict-resolution mechanisms for better preparedness. Dinar[463] warned that the fact of signing water treaties did not automatically promote riparian states cooperation, unless the treaty that is signed takes into consideration water variability, and is effectively implemented thereafter. As argues Hoffmann,[464] States are to deploy additional efforts to establish a truly universal culture of sharing water resources in transboundary contexts.

3.4 The particular evolution of the law of the transboundary waters in Africa

The genesis and evolution of transboundary water principles and laws as outlined above generally occurred in the western hemisphere, where there were generally abundant water resources for all users.[465] If the western countries were arid, there is a strong likelihood that the evolution of the law of transboundary water resources would have been different. In Africa, and perhaps in some other regions of the world, the law of the transboundary water resources has evolved differently, because of the continent's particular context. The aim of this section is to throw lights on the particular evolution of this field of law in Africa. Such a light will with no doubt contribute to reaching the objective of this thesis.

The laws and principles that govern the transboundary water resources that developed in the western hemisphere were initially applied in Africa to serve the interests of the colonial powers.[466] After the independence of the African states in the 1960s, political conflicts, wars, violence, and atrocities, apart from chronic underdevelopment, replaced colonisation and settled in many parts of the continent, seemingly to never leave.

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[462] Perlman (note 27 above; 117).

[463] S. Dinar *et al.* 'Do treaties matter? Climate change, water variability, and cooperation along transboundary river basins' (2019) 62 *Pol Geo* 162, 162-163.

[464] Hoffmannn & McIntyre (note 255 above; 31).

[465] McCaffrey (a) (note 145 above; 65).

[466] M. Kamto 'Le droit international des Ressources en eau Continentales Africaines' (1990) 1 (36) An fr de dr int 843, 847).

3.4.1 The prevailing context before and during the colonial period

In general, colonialism is regarded as the event in history that introduced the practice of transboundary water laws on the African continent, through the introduction of the modern-like boundaries to separate the colonial states that were formed on the continent.[467] The forms of the African states before colonisation did not address transboundary waters issues in the same manner as after the colonisation settled on the continent. Goody[468] claimed that in pre-colonial Africa, governing powers were mainly concerned with the people rather than the lands. States and empires were characterised by widely distributed populations and diffused boundaries to separate the governing powers.[469] People practised extensive agriculture due to the underdevelopment of local technics and technologies, which often led the population to relocate into new settlements in the quest for better agricultural lands, to guarantee adequate food production.[470] All the foregoing caused states' boundary to be unstable. This is why Allott[471] argued that "the territories of the rulers in pre-colonial Africa were defined by the limits of the spaces occupied by their subjects".

To draw the boundaries between their territorial possessions in Africa, the European colonial powers choose to involve to the possible extent the watercourses of the continent, which they used as natural boundaries.[472] The western, central, and eastern regions of Africa were particularly concerned, as they all traversed by dense hydrographic networks.[473] National boundaries were thus introduced in Africa, not to geographically define the tribal communities, kingdoms, or empires on the continent, whose territories were loosely demarcated, but to separate the European colonies on the African soil. In that

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[467] See for example the agreement between Great Britain and France, fixing the boundary between the possessions of the two countries at the North and Eastern borders of Sierra Leone. See E. Hertslet *The map of Africa by treaty* (2013), 57-58.

[468] J. Goody *Technology, Tradition and the State in Africa* (1971), 30.

[469] J. Herbst 'The creation and matintenance of national boundaries in Africa' (1989) 4 (43) *Int Org* 673, 679.

[470] *Ibid*. at 679.

[471] A. Antony 'The Changing Legal Status of Boundaries in Africa' in K. Ingham (Ed) *Foreign Relations of African States* (1974), 117.

[472] A.I. Asiwaju *Partitioned Africans: ethnic relations across Africa's international boundaries, 1884-1984*. (1985).

[473] See chapter 5 below for a description of the Congo hydrographic basin.

manner, 30 to 40 percent of African ethnic groups were split and assigned to different new states.[474] Even if later, the European colonialism tried to rectify this historical error by importing on the continent the nation-state concept, consequences of upsetting numerous of the continent's political and geographical organisations have had long-lasting consequences.

3.4.2 Early experiences of water agreements on African transboundary rivers

Written agreements on Africa's transboundary rivers appeared during the early stages of the European colonisation.[475] During the colonial era, the watercourses that were considered international are those that crossed the territories under the control of one European colonial power into the territory of the other.[476] In other words, boundaries that were considered international were the boundaries that separated the territories under the influence of the colonial powers instead of the boundaries that separated the African states.[477]

In its early days of colonisation, the Niger river was regarded as an international river, on the ground that it crossed the territories controlled by the British and the French, which were two different European colonial powers.[478] At the same time, the Senegal river was regarded as a domestic because it was entirely flowing through a French zone of influence, even though the French zone of influence it crossed comprised many African colonial states. The Senegal River basin accessed the status of an international river basin in 1958, after the Republic of Guinea, and three other riparian states gained their political independence.[479]

The early water agreements that were passed between the colonial powers were mainly based on land acquisition and boundary demarcation; water resources were included only on a secondary basis.[480] During the phase of colonial boundary demarcation,

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[474] *Ibid.*

[475] R. Yakemtchouk 'Regime International des Voies d'Eau Africaines' (1969) 5 *Le. Rev. BDI* 480, 481.

[476] *Ibid*. Yakemtchouk ; B. Davidson *Modern Africa: A social and political history* (2014), 5 & 9.

[477] *Ibid*. Davidson.

[478] *Ibid*.

[479] *Ibid*. at 127.

[480] See for example the 1862 convention which allowed France to acquire rights to lands from the Danakils, in the Horn of Africa. The Convention then addressed issues regarding water withdrawal from the waters of

Asiwaju[481] noticed the water resources that once belonged to one community were cut off from them after the drawing of the boundary lines fell at the "wrong place". Some colonial water treaties aimed at solving this issue, and facilitate the access of "native" to their ancestral water resources. The example here is the *Exchange of notes in 1895, between France and Great Britain on the navigation and use of the waters of the Great Scarcies River*.[482] This agreement related to the "Great Scarcies River" also known as the "Kolenté River", that is currently shared between the Republics of Sierra Leone and Guinea.[483]

The motivation behind it was the acknowledgement by the two signatories that the boundary they were drawn on the map fell at a wrong place on the ground.[484] The 1895 Agreement was then signed with the view of correcting that mistake and allow the inhabitants who dwelled on the right bank of the river, to continue accessing their waters as usually, after these waters were cut off from them by the colonial boundaries in the area.[485]

3.4.3 The post-Independence period

The post-independence period runs approximately from the year 1959 to the year 1989. It covers the space of time between the first experiences of states' independence on the continent to the time of the arrival of the so-called democratic regimes in Africa. Most of the independences on the continent occurred between the years 1959 and 1965. The first agreement on transboundary waters signed between two independent African states was the "Agreement between the Republic of Sudan and the United Arab Republic for the Full

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the acquired lands. France had to establish reservoirs "by common consent". See Herbst (note 469 above; 1134-1135); J. Lautze & M. Giordano 'Transboundary water law in Africa: Development, nature, and geography' (2005) 45 *Nat. Res J* 1053, 1058.

[481] The arbitrary boundaries that were established on the African continent caused the separation of close ethnic groups, as these ones were put under different new countries and different colonial administrations. Altough figures be not the same, Asiwaju argues that 30 – 40 percent of African ethnic groups, namely about 177 African tribes, were split in that manner and assigned into different States. See Asiwaju (note 458 above).

[482] UN Legislative Series (12); Teclaff (e) (note 174 above; 119).

[483] Information available at *https://www.britannica.com/place/Great-Scarcies-River* , accessed on 25 May 2019.

[484] See for more details Lautze & Giordano (note 480 above; 1058).

[485] *Ibid*.

Utilisation of the Nile Waters" signed in Cairo on November 8, 1959.[486] Lautze[487] noticed that this agreement followed the trend of the agreements on transboundary waters that were signed during the colonial period. This seems "understandable" because African states were still young, and most of the leaders who accessed political positions had no experience in transboundary water matters.

After the 1959 Cairo Agreement there came forth several other transboundary water treaties, whose objectives and contents were generally different from the trend of the colonial period. These new treaties were less concrete, but focused on joint management institutions and water allocation and waterworks, with widespread concerns regarding water developments other than the construction of dams.[488] Gupta[489] appreciated what she called "the commendable efforts" deployed by African post-colonial governments to develop standard rules in order to reach a level of institutionalised relations at river basin level, which at that time, constituted a significant contribution to peace and stability on the continent.

The post-independences period seemed more favourable to water treaties than the period before. Some 72 water agreements were signed during the three first decades after independence, against 49 during the centenary of the colonial period.[490] These treaties were generally motivated by territorial issues than by the sharing of water resources. The first generation of these type of treaties was negotiated either in water-scarce environments or in river basins characterised by high water developments, where water uses were relatively higher than water supply.[491] Twelve treaties that covered river basins were signed during this period, against seven during the colonial period.[492] These treaties

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[486] Full text of the agreement available at *http://www.fao.org/3/w7414b/w7414b13.htm* , accessed on 20 May 2019.

[487] Lautze & Giordano (note 480 above; 1061).

[488] *Ibid*. Lautze & Giordano at 1062.

[489] J. Gupta (d) 'The watercourses convention, hydro-hegemony and transboundary water issues' (2016) 3 (51) *The Int Spect* 118, 127.

[490] For Lautze, the above 72 Agreements are mainly "transnational agreements", usually aimed at facilitating development aid. They were signed whether between one riparian and the others, or with a certain organisation. See Lautze & Giordano (note 480 above; 1061).

[491] FAO *Atlas of Water Resources and Irrigation in Africa* (2001) *available at http://www.fao.org/ag/agl/aglw/aquastat/gis/index.stm* , accessed on 10 June 2019.

[492] Lautze & Giordano (note 480 above; 1064).

generally shifted from being bilateral to becoming multilateral. Sixty percent of the treaties were multilateral, of which 75 percent included nearly all the riparian states.[493]

From a treaty content perspective, two-thirds of the treaties encouraged the exchange of information and hydrological data, whereas an increased consideration was given to the principle of "Equity".[494] African water treaties used for the first time the concept "equitable", as a basis for water agreement in the "Treaty on the Lesotho Highlands Water Project", signed in Maseru on October 24, 1986, between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho.[495]

From a conflict resolution perspective, the transboundary water treaties signed during the post-independence period incorporated some provisions with conflict resolution mechanisms, which were generally an arbitration tribunal, whether the OAU or the UN. The Convention of Bamako adopted in July 26, 1963, between Guinea, Mali, Mauritania, and Senegal, or the "Act regarding navigation and economic co-operation between the states of the Niger Basin" adopted on October 26, 1963, between Benin, Burkina Faso, Cameroon, Chad, Guinea, Ivory Coast, Mali, Niger, and Nigeria, are good examples in this regard.[496]

3.4.4 The late independence period

This period runs approximately from the year 1990 to 2010 and is particularly productive for the African continent regarding the law of transboundary water resources. During this period, the size and the content of the law of transboundary water resources would improve significantly.[497] The transboundary water treaties that were signed during this period often

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[493] *Ibid.*

[494] *Ibid.*

[495] Treaty available at *http://www.fao.org/3/w7414b/w7414b0w.htm* , accessed on 12 May 2019.

[496] Article 7 of the "Act regarding navigation and economic co-operation between the states of the Niger Basin" of 1963 provides: "Any dispute that may arise between the riparian States regarding the interpretation or application of the present Act shall be amicably settled by direct agreement between them or through the Inter-Governmental Organisation referred to in Articles 5 and 6 above. Failing such settlement, the dispute shall be decided by arbitration, in particular by the Commission of Mediation, Conciliation and Arbitration of the Organisation of African Unity, or by judicial settlement by the International Court of Justice."

[497] Lautze & Giordano (note 480 above; 1062).

comprised various other concerns, among which were found some issues that touched the economic development of entires river basins.[498] Also, treaties' responsiveness to emerging topics concerning natural resources governance would improve, apart from states trend to return to the practice of bilateral treaties instead of the multilateral. For instance, this period coincides with the rise of the sustainable development concept at the global level, which concept the United Nations would recommend to include in any project that would interfere with natural resources.[499] Some authors argued that the inclusion of the sustainable development approach in development planning represented a significant paradigm shift in the field of natural resources governance, including water.[500]

Contributions towards this evolution included the development of international and regional water laws. Multilateral agreements such as the 1997 UNWCC, the 1999 Southern African Development Community (SADC) Agreement on Shared Water Resources, and its revised protocol of the year 2000, were all adopted during this period.[501] Meanwhile, some 36 transboundary water treaties were also signed continent-wide.[502] While some of these treaties were an update of existing agreements on transboundary waters, others were just new agreements. The Congo River basin is among the basins that were equipped with a new basin-based water agreement during this period, in the year 1999.[503] All these treaties enriched the continent's list of applicable instruments in the field which is being studied.

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[498] *Ibid*.

[499] See note 222 above.

[500] WCD *Dams and Development, a New Framework for Decision-Making* (2000), chapter 1; PAGE *Integrated Planning & Sustainable Development: Challenges and Opportunities* (2016), 14-15.

[501] The SADC is a regional organisation that gathers the countries of the southern region of Africa. More information on the SADC available at *http://www.sadc.int* , accessed on 19 May 2017; For further details on the SADC's Agreements on shared water resources, see note 165 above.

[502] Lautze & Giordano (note 480 above; 1062); Examples in this category of treaties include the "Agreement concerning financial co-operation", adopted in Dakar, on May 22, 1990, the "Technical Protocol on Water Resources between the Ministry of Public Works and Water Resources and the Ministry of Public Works and Regional Planning in Romania" adopted in Cairo, on May 17, 1994, which are all available at *https://treaties.un.org/*, accessed on 24 May 2019.

[503] See Chapter 5 and 6 below for further details on the Congo River basin.

From a spatial distribution perspective, this period was marked by more treaties being signed southwards than north or westwards, as it was the case during the post-independence period, or the colonial period.[504] Twenty-seven percent of these agreements applied to the Orange River basin, with about 19 percent of them dealing with the waters of the Inkomati River Basin.[505] The southwards predominance of the treaties of this period remains striking, even if one has to exclude the 1999 SADC Agreements on Shared Water Resources of its amendment of 2000.

The percentage of treaties establishing hydrologic data exchange increased, whereas two-thirds of them were now referring to water quality. The already high proportion of treaties containing conflict resolution mechanisms in the previous period remained almost the same.[506] Approximately three-quarters of the treaties of this period either assumed or created transboundary water management institutions, or even attempted to set up frameworks for future developments.

From a state's involvement perspective, the number of countries that participated in a single treaty decreased. Treaties of this period were less multilateral and more bilateral, with more than 50 percent of them being bilateral. Such a shift was revealing a significant move to return to the practice of negotiting water treaties from a state to state basis. In paralel to this remark, Nader[507] noticed that hegemon states were comfortable signing bilateral treaties than the multilateral. Perhaps, as argued by this author,[508] even for non-hegemon states, negotiating bilateral treaties on transboundary watercourse appeared more comfortable than negotiating the multilateral ones.[509] The Republic of South African, which is the water hegemon of the Southern African region, managed, for instance, to

[504] Treaties northwards were adopted on the waters of the Nile River basin. See Yakemtchouk (note 475 above; 482).

[505] Lautze & Giordano (note 480 above; 1066).

[506] *Ibid*. at 1064.

[507] L. Nader 'Civilisation and Its Negotiations' *in* P. Caplan & P. Caplan (eds) *Understanding disputes: The politics of argument* (1995) 39, 52.

[508] *Ibid*.

[509] *Ibid*.

secure during this period a significant number of bilateral agreements on its shared water resources.[510]

A further significant evolution during this period includes the fact that there seemed to be an increased reference to the concepts of "equity", whereas half of the agreements adopted criteria for water allocation between treaty signatories.[511] The concept of Equity is referred to in these agreements, either as an overarching treaty principle or as a criterion for water allocation. As argues by Dellapenna,[512] treaties signed after the year 1997 were most probably influenced by the 1997 UNWCC, which for him has acquired the legitimacy of customary law. The SADC Protocol on shared watercourses of 2000 for instance offers an example of a regional water treaty that was amended on the basis of the 1997 UNWCC.[513]

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[510] See for instance the "tripartite permanent technical committee ministerial meeting of Ministers responsible for water affairs", which was signed between South Africa, Mozambique and Swaziland in February 15, 1991. See also the Protocol IV to the treaty on the Lesotho Highlands Water Project: supplementary arrangements regarding phase IA signed in November 19, 1991 between South Africa and Lesotho. See the "Treaty on the development and utilisation of the water resources of the Komati River Basin between the government of the Kingdom of Swaziland and the government of the Republic of South Africa" signed in March 13, 1992.

[511] See the "Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Scheme between the Government of the Republic of South Africa and the Government of the Republic of Namibia" signed in Pretoria, on April 26, 1993; See also the agreement between the government of the Republic of South Africa and the government of the Republic of Namibia on water related matters pertaining to the incorporation of Walvis Bay in the territory of the Republic of Namibia, signed on March 1, 1994.

[512] Dellapenna (note 24 above; 285-287).

[513] The Southern African Development Coordinating (SADCC), is a southern African regional organisation, which was established on August 17, 1992 in Windhoek, Namibia through the adoption of the SADC Treaty. Its precursor was the Southern African Development Coordinating Conference (SADCC), was established on April 1, 1980. The aim of the SADC is to achieve development, peace, security, economic growth, to alleviate poverty, enhance the standard and quality of life of the peoples of Southern Africa, and support the socially disadvantaged through regional integration, built on democratic principles and equitable and sustainable development. See for more details *https://www.sadc.int/about-sadc/overview/,* accessed on 12 April 2019. Even though at the time of the drafting of this thesis, the majority of African states refrained from its ratification, it is worth noticing that 11 of the 36 states that have already ratified the 1997 UNWCC are African, suggesting that despite a weak participation in the 1997 UNWCC, the African states have on average more represented in this convention than the states of the other continents. For an overview concerning the states that have ratified the 1997 UNWCC, see Annexe 3 below.

3.4.5 Current stage and way forward

The general sense is that the African practice in the field of transboundary water treaties has revealed itself broadly evolutionary, and will more likely remain so in the foreseeable future, given the growing necessity for state adaptation in the water law sector. Passing Agreements on transboundary water resources has been practised on the African continent for some 150 years.[514] Africa's participation in the international water regime is judged satisfying by some scholars who found that the continent accounted for more than one-quarter of the world's known transboundary water treaties.[515] Such an infatuation has even surprised Lautz & Giordano[516] for whom Africa has a reputation of being meagrely involved in international environmental platforms.

The Sustainable Development Goal 6.5.2 on "Proportion of transboundary basin area with an operational arrangement for water cooperation" stresses the importance of water cooperation.[517] As per the SDG 6.5.2, an arrangment is considered operational if it creates a joint body, some joint management plans or objectives, institutes regular (once a year as a minimum) and formal communication between the riparian countries and exchange of data and information at least once a year.

Despite the satisfying participation of the continent in the development of the international law of transboundary water resources, there seem to be some areas for improvement, which seem particular to the African continent. These areas include treaties implementation, which constitutes an area for improvement on the continent. Some of the African water treaties mentioned above were never implemented after the signature.[518] Adopting a treaty on shared waters is critical, but its implementation and institutionalisation seem even more determining and should, as such, attract more attention from scholars for an improvement.

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[514] Lautze & Giordano (note 480 above; 1062).

[515] M. Giordano 'The Internationalization of Wildlife and Efforts Towards Its Management: A Conceptual Framework and the Historic Record' (2002) 14 *Geo Int'l Envtl L Rev* 607, 615-620.

[516] Lautze & Giordano (note 480 above; 1071).

[517] See for more details at https://www.sdg6monitoring.org/indicator-652/ (Accessed on 12 October 2020).

[518] *Ibid.*

The quasi dependence on public assistance to development constitutes a second area for improvement. African states are in the majority in a position of dependence on external assistance to equip their transboundary watercourses and river basins with adequate laws and policies.[519] The evolution of the field of transboundary water treaties in Africa seemed synchronised with the evolution that occurred at the global level. The synchronisation was mostly based on the practice of public assistance to development, which is conditional assistance, depending on the donors' objectives. [520] The evolution of the African transboundary water treaties was, therefore, influenced and perhaps oriented in a particular direction, depending on the donor's objectives.[521] The fear is that such oriented assistance (yet necessary on the continent) may result in watercourses and river basins treaties being off the mark, because of the pre-established results and objectives that come with the external assistance.

Discussing on African hydro politics and treaty formation, Sadoff[522] noted that the hegemonic behaviour on the continent would probably not be a limiting factor to future treaties. For Sadoff, the few African regional hegemons - Nigeria, Egypt, and South Africa, that are involved in more than 55 percent of Africa's transboundary agreements, are likely to behave constructively. Even though they also enter in basin-wide water arrangements, African regional hegemons have a strategic preference for bilateral treaties, and will most probably keep the same reflex in future.[523]

Regarding the climate change phenomenon, the African transboundary water resources will generally be affected. The negative impacts that are announced include significant changes in the hydrological cycles at several river basins, suggesting a paradigm shift in the current states treaty practices across the continent in the field of transboundary

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[519] C.J. Barrow 'River basin development planning and management: A critical review' (1998) 1 (26) *Wo dvpment* 171, 179.

[520] *Ibid*.; Regilme et al. 'Mutual delegitimization: American and Chinese development assistance in Africa' (2018). Forthcoming; H. Doucouliagos & M. Paldam 'Conditional aid effectiveness: A meta-study' (2010) 4 (22) *J of Int Dev: The J of the Dev Stu Ass* 391.

[521] *Ibid*.

[522] C.W. Sadoff *et al. Africa's international rivers: an economic perspective* (2002), 10-11.

[523] Nader (note 507 above; 42).

waters.[524] As argued by Bakker,[525] the vast majority of water treaties that are currently in power on the continent were signed during the pre and post-independence periods, under more stable climatic and environmental contexts.

The perpetually changing climatic conditions will drive a perpetual change of the context in which the riparian states will be signing new water treaties.[526] A remarkable example here can be taken from the Columbia River Treaty, even if this one is a non-African river basin. The USA and Canada, who are the two signatory states of the Columbia River Treaty have planned to renegotiate this treaty in 2024.[527] The treaty was initially signed in 1961. However, the treaty's signatory states have noticed significant changes in the overall context of the treaty, between what the context used to be in 1961 and what it has become currently.

In a nutshell, the law of transboundary water resources has received a positive response from the African states, from the early times of states accession to independence down to the present. The African transboundary water treaties have been responsive to the developments of the global context. Under climate change, the African continent will need to assess its existing treaties on transboundary water resources with the view of including in treaty bodies the adequate mechanisms for regime responsiveness to climate change.[528]

3.5 Special contributions towards the current international regime of transboundary watercourses

The international regime of the transboundary watercourses as it stands today has received significant contributions from diverse factors and fields. The next section will discuss some of the crucial contributions the regime has received. These include the formation and consolidation of state boundaries at the global level, the Roman laws, the navigation law, the works of scholars in water associations, and some judicial and arbitral decisions from

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[524] See section 2.2.6 above.

[525] Bakker & Duncan (note 33 above; 420).

[526] M. Giordano *et al.* 'A review of the evolution and state of transboundary freshwater treaties. (2014) 3 (14) *Int Env Agr Pol L & Ec* 245, 261-262.

[527] M. Brady *et al.* 'The Columbia River Treaty renegotiation from the perspective of contract theory (2015) 1 (155) *J of Cont Wat Res & Ed* 53, 54.

[528] Bakker & Duncan (note 33 above; 420).

the ICJ and the PCIJ. However, to stay consistent with the objective of this thesis, the discussions will only provide the outlines of each of these contributions, with references to further readings.

3.5.1 The contribution from the Roman Law

The Roman system of laws is the basis of many modern legal systems worldwide.[529] The earliest legal texts found on the law of International waters are Romans. Roman law has profoundly contributed to the emergence of specialised branches of law, including the law of transboundary water resources.[530] A principle such as the freedom of navigation emerged under Roman's law.[531] The Roman legal system has evolved during almost 1500 years, to which evolution water law was intrinsically related.[532]

The spreading of the Roman water law across the globe took place after the fall of the Roman dominion; it was an essential step towards the formation of the modern laws of transboundary water resources.[533] In general, three factors have contributed to the spreading of the Roman water law worldwide. These are *first*, the European colonial experience, *secondly*, the freedom of navigation principle and regime, and *thirdly*, the formation of modern independent states in the ancient European colonies in Africa and elsewhere.[534]

The European colonial experience helped expand the Roman water law across the planet in Asia, Africa, and South America particularly.[535] Depending on the context, whether water-rich or water-scarce, the Roman law then developed differently. The colonial regimes where Roman law landed acted also like driving forces in support of the local development of the laws to govern transboundary water resources.[536]

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[529] For an history of the Roman Water Law, see Caponera & Nanni (c) (note 147 above; 33-60).

[530] *Ibid*.

[531] See section 3.5.3 above.

[532] Caponera & Nanni (c) (note 147 above; 33).

[533] *Ibid*.

[534] *Ibid*.

[535] *Ibid*.

[536] L. Boisson de Chazournes *Freshwater and International Law: the interplay between universal, regional and basin perspectives* (2009), 2.

3.5.2 The contribution through the formation and consolidation of states boundary

The initiation of states' stable political boundaries marked the beginning of the formation of the international order.[537] The existence of stable boundaries between states contributed in turn to the negotiation of treaties on rivers that crossed over state's boundaries, as territoriality and sovereignty are two closely related concepts, which do not exist separately.[538] However, the emergence of recognised and stable states' political boundaries took centuries to occur, and it was only recently that the state's boundaries became the main feature of the global political geography.[539]

Even if the exact time when state boundaries formed remains unclear as already mentioned,[540] the concepts of territory and boundary as understood and observed nowadays, begun some 300 years ago.[541] It is only through defining states territories and boundaries that it became possible to address the issue concerning water resources that crossed states' political boundaries. Such an undertaking was both meaningless and unfeasible before. Once states became much organised politically and legally, the need increased for the regulation of issues associated with transboundary water resources at a supranational level. From an initial focus on single homogenous communities, water law evolved and started regulating transboundary water systems.

In a debate on the `spatial logic' of past societies, Isaac[542] argued that the rulers of ancient empires were not much interested in defining the boundaries of their domains.[543] What mattered most for ancient rulers was the control of the people and cities. They were preoccupied with this issue to the extent that some cities were fenced up inside

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[537] See Section 2.3.5 above.

[538] S. Waterman *Boundaries and the Changing World Political Order* Vol. I. (1994), 23.

[539] See section 2.3.5 for boundaries; A. Paasi 'The changing discourses on political boundaries. Mapping the backgrounds, contexts and contents' (2005) *B/ordering Space* 17, 19; J. Anderson `The shifting stage of politics: new medieval and post-modern Territorialities?' (1996) 2 (14) *Env and Plan D Soc & Space*, 133, 145.

[540] See Section 2.3.5 above.

[541] F.N. Ikome 'Africa's International Borders as Potential Sources of Conflict and Future Threats to Peace and Security' (2012) 233 *Inst Secu Stu* 16, 17-18.

[542] B. Isaac *The Limits of Empire: the Roman army in the East* (1990), 372-375; Paasi (note 539 above; 19).

[543] *Ibid*. Isaac; *Ibid*. Paasi.

fortresses.[544] In the view of Teclaff,[545] it was through the consolidation of state boundaries that the principles of the state's sovereignty and international cooperation and solidarity emerged. Every state needs to be "fenced up" and protected with defined boundaries, because, as puts Zaiotti,[546] "the boundary is the beginning of every order and everything". A sovereign state will, therefore, be entitled to full authority over and only within its territory.[547]

3.5.3 The contribution from the law of navigation

Men have practised navigation on waterways for millennia.[548] In many societies, navigation has always been part of people's lives. Societies have progressively developed the law of navigation on waterways, including those that traversed the territories of more than one state at once. In this section and in the rest of this thesis, navigation refers to "the use of a waterway by humans for the floating of any form of vessel",[549] whereas waterways are rivers, lakes, or channels through which flow the surface freshwaters.[550] The law of navigation has contributed significantly towards the formation and development of the international law of the non-navigational uses of transboundary water resources.[551] Historically, the scope of the non-navigational uses of the international water resources was generally insufficient to cause disagreements between riparian states. It was navigational uses that caused more problems.[552] It seems, therefore, logical that most of the early instruments and tribunal pronouncements in the field of international water law would have almost exclusively navigation as a central concern.[553]

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[544] *Ibid*. Isaac; *Ibid*. Paasi.

[545] Teclaff (e) (note 174 above).

[546] *Ibid*. at 23.

[547] A.J. Caporaso 'Changes in the Westphalian Order: Territory, Public Authority and Sovereignty' (2000) 2 *Int'l Stud. Rev*, 6.

[548] McCaffrey (a) (note 145 above; 171).

[549] *Ibid*. at 172.

[550] *Ibid*.

[551] *Ibid*. at 171; Boisson de Chazournes & Tignino (note 332 above; xiv).

[552] *Ibid*. McCaffrey (a) at 181.

[553] See section 3.5.5 below on the contribution from international jurisdictions.

Navigation is already present in the treaty of Munster and Osnabruck, signed respectively between France and the Empire and between Sweden and the Empire.[554] This historical treaty decided the Peace of Westphalia in 1648 and marked the beginning of the modern international legal system.[555] Navigation regulation developed later, in the eighteenth and nineteenth centuries with the boom of the shipping industry. The principle of freedom of navigation, which was already applied under Roman law, became one of the main features of navigation law.[556] From Europe, the principle expanded in other parts of the world, before its rejection.[557]

The re-establishment of the freedom of navigation under the Final Act of the 1815 Congress of Vienna, was a substantial benchmark to this principle's modern evolution.[558] Also, the 1885 General Act of Berlin, which came later, brought on its side significant support to the principle freedom of navigation, by extending its application outside the European continent, in the Congo and the Niger Rivers, in Africa.[559] Signed some three decades after the 1885 General Act of Berlin, the 1919 Peace Treaty of Versailles also perpetuated the same trend of freedom of navigation,[560] but went further, addressing issues regarding hydropower production, irrigation, and water supply, which are all non-navigational uses of waterways.[561]

After the world war I, nations that formed the essence of the "international community" at that time, excluding the defeated ones signed "The Convention and Statute on the Regime of Navigable Waterways of International Concern" on April 20, 1921, also

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[554] See generally P. H. Wilson *The Thirty Years War: Europe's Tragedy* (2011); R. Bonney *The Thirty Years' War 1618−1648* (2002).

[555] *Ibid*. Wilson; *Ibid*. Bonney, for further details on the peace treaty of Westphalia.

[556] Boisson de Chazournes (note 536 above; 2) ; See section 3.5.1 above for further details.

[557] *Ibid*. Boisson de Chazournes.

[558] Two treaties were signed in Paris, France, in May 30, 1814 and in November 20, 1815 respectively, whose aime was to end the Napoleonic wars. See for details: *https://www.britannica.com/event/Treaties-of-Paris-1814-1815* , accessed on 25 January 2019; see section 6.2.1.2 below for details on the 1815 Vienna Final Act.

[559] See section 6.2.2.1 for further details on the 1885 Berlin Final Act.

[560] The Treaty of Versailles was a capital agreement towards the end of World War I. It was signed on June 28, 1919, in Versailles, France, between Germany and the allied powers.

[561] 1919 Treaty of Versaille, Articles 358 , 359; Allouche (note 370 above; 33).

referred to as the 1921 Barcelona Convention and its adjacent Statute.[562] These instruments provided for navigation while recognising the non-navigational uses of the international waterways.[563] Article 10 (6) of the Statute on the Regime of Navigable Waterways of International Concern of 1921 provided:

> "Notwithstanding the provisions of paragraph 1 of this Article, a riparian State may, in the absence of any agreement to the contrary, close a waterway wholly or in part to navigation, with the consent of all the riparian States or of all the States represented on the International Commission in the case of navigable waterways referred to in Article 2. As an exceptional case, one of the riparian States of a navigable waterway of international concern not referred to in Article 2 may close the waterway to navigation, if the navigation on it is of very small importance, and if the State in question can justify its action on the ground of an economic interest clearly greater than that of navigation."[564]

The implementation of this provision provoked a progressive decline of both the principle of freedom of navigation and the primacy of navigational uses of the international waterways over others uses. Still, in 1929, the principle of freedom of navigation would be recognised as customary international law by the PCIJ in the *River Oder Case*[565] and later reinforced and expanded under various international conventions, which generally aimed at favouring all the nations in the use of transboundary waterways.[566] Even if the *River Oder* case was primarily concerned with issues regarding the rights of navigation, the PCIJ touched the non-navigational uses of the international watercourses while he concluded that

> "This community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian

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[562] Texts of these treaties available at *http://www.fao.org/3/W9549E/w9549e02.htm* , accessed on 2 May 2019.

[563] Article 10 (6) of the 1921 Barcelona Convention; Articles 108 to 117 of the 1815 Final Act of Vienna already contained provisions relating to the navigation on the international waterways of signatory states.

[564] Article 10 (6) of the 1921 Statute on Regime of Navigable Waterways of International Concern.

[565] See the *River Oder case* in Judgment No. 16 (PCIJ. Ser. A, No. 23, 1929). See also section 3.5.5 below.

[566] The 1885 General Act of Berlin and the 1921 Barcelona Act.

> states in the use of the whole course of the river and the exclusion of any preferential privilege of anyone riparian state in relation to the others."[567]

The PCIJ's judgement on the *River Oder* case would, therefore, become critical in shaping the international law of transboundary watercourses,[568] as it would judicially consecrate several international water law principles, as it will be discussed further.[569]

3.5.4 The contribution from scholars in law associations

Two non-official bodies of scholars have been particularly active in the field of international water law. These two bodies of scholars are the Institute of International Law (IIL),[570] and the International Law Association (ILA).[571] Most of the principles of transboundary water law were formulated and proposed either by the ILA or the IIL.[572] Their contributions, which are even engraved in the preamble of the 1997 UNWCC are mentioned in this section.

The International Law Association (ILA) begun to work on international water law in 1954,[573] after the establishment of what was called the "Committee on the Uses of the Waters of International Rivers."[574] It was in 1956 that the ILA adopted its first set of principles of water law, which, it called "*A Statement of principles upon which to base rules of law concerning the uses of international rivers*". This first ILA statement is also referred to as the "Dubrovnik Statement."[575] The Dubrovnik Statement was followed by the ILA Resolution of New York of 1958, whose Article 2 confirmed the right of a co-

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[567] *River Oder* case, Judgment No. 16, 1929, P.C.I.J., Series A, No. 23; See also section 3.5.5 below.

[568] See section 3.5.5 below.

[569] See section 4.3 below.

[570] See section 3.3.3 above, and note 429 for further details on the IIL.

[571] See section 3.3.3 above, and note 428 for further details on the ILA.

[572] See recital 10 of the preamble of the 1997 UNWCC.

[573] For further details on the ILA's contributions, *see* Bourne (note 356 above, 156).

[574] The "Committee on the Uses of the Waters of International Rivers" was known as the "Rivers Committee." See Salman (b) (note 358 above; 628).

[575] The Dubrovnik Statement was released at the forty-seventh conference of the ILA, held at Dubrovnik, Croatia, in 1956. The conference aimed at considering the first report released by the committee on the uses of the waters of international rivers, especially the statement of principles contained therein; See C.B. Bourne *International water law: selected writings of Professor Charles B. Bourne* (1997) Vol.1, 159–60.

riparian state to be entitled a reasonable and equitable share of any benefit that may derive from the use of a shared water resource within a drainage basin.[576] During a meeting in Kyoto, in 1964, the ILA would then discuss the principle of reasonable and equitable utilisation, which at that time was already enounced in the 1958 New York Resolution.[577]

The IIL has been active in the field of the non-navigational uses of international watercourses since the beginning of the twentieth century.[578] The Organisation issued its first contribution to international watercourses in 1911 through a work that was entitled "International Regulations Regarding the Use of International Watercourses for Purposes Other than Navigation", well known as the "Madrid Declaration".[579] For Salman,[580] the 1911 Madrid Declaration was based on the doctrine of limited territorial sovereignty.

The 1911 Madrid Declaration is doubtlessly one of the earliest and most significant contributions from the IIL. It used the concept "international watercourses" rather than "international rivers", and introduced the "no-harm" principle, which is regarded as a cornerstone principle in the field of international water law.[581] Having imposed the no-harm principle restrictions on the riparian states, the 1911 Madrid

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[576] Section 2 of the New York Resolution provides: "Except as otherwise provided by treaty or other instruments or customs binding upon the parties, each co-riparian State is entitled to a reasonable and equitable share in the beneficial uses of the waters of the drainage basin. What amount to a reasonable and equitable share is a question to be determined in the light of all the relevant factors in each particular case."

[577] ILA, the 51st Conference Report, held in Tokyo, Japan, in 1964, progressing in the formulation of the equitable utilisation principle, the ILA stated: "Any use of water by a riparian State, whether upper or lower, that denies an equitable sharing of uses by a co-riparian State conflicts with the community of interests of all riparian States in obtaining maximum benefit from the common source. Thus, uses of waters by a riparian State that cause pollution resulting in injury in a co-riparian State must be considered from the overall perspective of what constitutes an equitable utilisation." 51st Conference Report available at *http://www.ilajapan.org/doc/tokyo_1964.pdf* , accessed on 23 July 2019.

[578] The IIL is active in the field of international water law since the 19th century. It adopted in 1887 a "Draft International Regulation on River Navigation"information available at *http://www.idi.iil.org* accessed on 23 July 2019; Biswas (note 171 above; 13-14).

[579] Furher information on the 1911 Madrid Declaration available at *http://www.idi-iil.org/en/sessions/madrid-1911/?post_type=publication* , accessed on 23 July 2019.

[580] Salman (d) (note 348 above; 13).

[581] Article 2 of the 1911 Madrid Declaration; See section 4.3.3 below for details on the no-harm principle.

Declaration would prove to be a rejection of the absolute territorial sovereignty doctrine. This Declaration would also provide a distinction between the rivers that form states boundaries, and those that traverse states successively.[582] Such distinction was an essential contribution because it offered the fundamental basis for thinkings regarding the transboundary watercourses.

After the 1911 Madrid Declaration, the IIL issued its second resolution entitled "Utilisation of Non-Maritime International Waters (except for navigation)" of 1961, also known as the "Salzburg Resolution", which did target mainly on the non-navigational uses of the transboundary watercourses. [583]

In 1966, the ILA would propose an updated format of the 1956 Dubrovnik Statement and its subsequent instruments, including both the 1958 New York and 1964 Kyoto Resolutions. The ILA's update would be known as the "Helsinki Rules on the uses of the waters of international rivers of 1966", abundantly referred to in this thesis. The ILA's *Dubrovnik Statement* confirmed that any state had sovereign control over an international watercourse within its boundaries, but required from the said state to exercise such sovereignty with due consideration on its impacts upon the sovereignty, or the rights of the other riparian states.[584] From a substantial perspective, the Dubrovnik Statement was a rejection of both the *absolute territorial sovereignty doctrine* and the *absolute territorial integrity doctrine*. The Statement instead recognised the right that all riparian states had naturally over a shared watercourse. Sadly, the Dubrovnik Statement failed to provide any guidance as to how such rights of states could be defined and exercised among riparian countries.[585]

The 1966 Helsinki Rules proposed by ILA were erected on the principle of equitable utilisation of international water resources.[586] States and scholars' consideration

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[582] Concerning the streams that form a boundary between states, see Article 1 of the 11 the Madrid Declaration.

[583] The IIL "Resolution on the Utilisation of Non-Maritime International Waters (except for navigation)" was adopted on September 11, 1961, in Salzburg, Austria. The full text of the resolution is available at *http://www.idi-iil.org/app/uploads/2017/06/1961_salz_01_en.pdf* , accessed on 05 May 2019.

[584] *See* Section 3 of the Dubrovnik Statement.

[585] See Salman (d) (note 348 above; 18).

[586] The "Helsinki Rules on the Uses of the Waters of International Rivers" also referred to as the "1966 Helsinki Rules" were adopted in Helsinki, Finland on August 20, 1966, by the ILA. It aimed at providing

vis-à-vis the 1966 Helsinki Rules grew considerably after the issuance of the rules. The 1966 Helsinki ules were considered the most authoritative set of rules regarding the use and protection of the international watercourses before the codification of the international law of the non-navigational uses of the international watercourses. During that period, the principles established under the 1966 Helsinki Rules were regarded as reflecting customary international law in the field of transboundary watercourses.[587]

Concerning flood management and control principles and guidelines, the ILA made an early and significant contribution through its "1972 Articles on Flood Control", of which provisions had to be observed in transboundary contexts.[588] Key principles such as the cooperation "with respect to flood control", the communication of flood warning information and data between the riparian states "as soon as possible", while ensuring priority in emergency cases, already occupied a central place in ILA's instrument. According to the ILA, the expenses related to flood control measures at transboundary contexts had to be borne jointly by the basin States, which for this body of scholars are called upon to cooperate in such matters.[589]

After the adoption of the 1997 UNWCC, the Water Resources Committee of the ILA officially recognised that the changes in the context of the internationally shared water resources were so profound and rapid, that it became justified to revise both the 1966 *Helsinki Rules* and the supplemental rules thereof.[590] In 2004, in Berlin, Germany, the ILA adopted an updated version of the 1966 Helsinki Rules, referred to as the "Berlin Rules on Water Resources" of 2004.[591]

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some international guidelines for the regulation of the use of transboundary water resources including the rivers and connected groundwaters.

[587] Salman (d) (note 348 above; 18).

[588] ILA Resolution on Flood Control (1972), available at: https://www.internationalwaterlaw.org/documents/intldocs/ILA/ILA-Articles_on_Flood_Control-New_York1972.pdf , accessed on 15 November 2020.

[589] See Articles 2, 3and 4 of the ILA Resolution on Flood Control (1972).

[590] The ILA first consolidated its expanding rules in a single instrument, which was known as "The Campione Consolidation of the ILA Rules on International Water Resources, 1966–1999." It was finalised in June 1999, in Campione, Italy. See Salman (d) (note 348 above; 55-56).

[591] See Section 3.3 above.

3.5.5 The contribution from major international judicial decisions and arbitral awards

In the period that preceded the 1956 Dubrovnik Statement seen above, there were very few judicial decisions or arbitral awards in the field of the non-navigational uses of transboundary watercourses. The consulted literature is generally convergent concerning four contributions from this area, including the *River Oder* case, the *Trail Smelter* arbitration case, the *Lake Lanoux* arbitration case, *and* the *Corfu Channel* case. The *River Oder Case* was pronounced by the PCIJ in 1929, the *Trail Smelter* case and the *Lake Lanoux* are two arbitration cases pronounced by the ICJ in 1941 and 1957 respectively, whereas the *Corfu Channel* case is the only judgment the ICJ issued, and it was in *1949*.[592] The list of cases discussed in this section should not be approached as the only cases that have contributed to the formation of the international law of transboundary watercourses.

The first contribution to be envisaged is the *River Oder Case*, which was a disagreement that opposed Czechoslovakia, Denmark, France, Germany, and Sweden, the United Kingdom on one side, versus Poland on the other side.[593] The case brought before the PCIJ related to whether under the 1919 Treaty of Versailles, the jurisdiction of the International Commission of the Oder River extended as well to sections of the tributaries of the Oder River, which include the Warthe and Netze, two tributaries of the Oder River that stemmed from the Poland territory.[594] Poland claimed that the jurisdiction of the Oder Commission excluded the sections of the tributaries in the Polish territory. The other six countries claimed the opposite. The Court ruled in favour of the six opponents to Poland and stated that the jurisdiction of the Oder River Commission extended to certain tributaries of the Oder River, which were situated in Poland.

Though the case concerned questions of rights of navigation, the conclusion of the PCIJ supported the fact that states that share a transboundary watercourse are in a situation of "community of interest" vis-à-vis the waters of the common river. The PCIJ conclusion reads: "This community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian

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[592] With the *Silala River case* pending before the ICJ, the expectation is that the list of judicial decisions rendered in transboundary issues increases the so far meager contribution brought in this field.

[593] PCIJ. Ser. A, No. 23 (1929) *the River Oder* case, 5 & 27.

[594] *Ibid.*

states in the use of the whole course of the river and the exclusion of any preferential privilege of anyone riparian state in relation to the others."[595]

Scholars have often concluded that the PCIJ's pronouncement on the *Oder River case* could be applied to a certain extent to the non-navigational uses of the transboundary watercourses. Lipper[596], for instance, found that the pronouncement of the court instituted perfect equality of all riparian states regarding their shared watercourse, whereas Lammers[597] points out the fact that the PCIJ's decision does not relate only to navigational concerns, but included the non-navigational as well.

The second contribution is the *Trail Smelter* Arbitration case, which was an affair between the USA and Canada.[598] The motive of the conflict was that smelting operations on the Canadian State of British Columbia by a private company caused the emission of significant amounts of sulphur dioxide fumes into the air. By that, it caused unintended damages to some USA citizens and to crops and timbers, on the other side of the border, in the State of Washington. The two countries established an International Commission under the 1909 Boundary Waters Treaty to settle the matter. The Commission assessed the damages that were caused to be around US $350,000, which Canada would pay to the USA. The recommendations of the commission were rejected by the USA.[599] The parties then decided to proceed with the matter into a further settlement.

On April 15, 1935, the USA and Great Britain signed a convention, which they called "Convention for the Settlement of Difficulties Arising from Operation of the Trail Smelter" This convention helped establish a three-member tribunal whose mission was to deal with the matter.[600] In 1941, the Arbitration Tribunal on the *Trail Smelter* case concluded:

> "No state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons

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[595] *Ibid.*

[596] J. Lipper 'Equitable utilization' in A.H. Garretson *et al.* (eds) *The law of international drainage basins* 15 (1967), 29.

[597] Lammers (note 413 above; 507).

[598] *See Trail Smelter* Arbitration (*United States v. Canada*), R.I.A.A. 1911, 1965 (1941), 3.

[599] *Ibid.*

[600] *Ibid.*

therein when the case is of serious consequence, and the injury is established by clear and convincing evidence."[601]

Although it was not primarily concerned with the non-navigational uses of the international watercourses, the *Trail Smelter* case has been a significant contribution in the field by helping establish the principle according to which no state is entitled to cause or allow its territory to cause significant environmental damages to another state.

The third contribution to be mentioned is the *Lake Lanoux* case,[602] which was an arbitration between France and Spain, brought before the ICJ, in 1957. The case concerned a unilateral hydroelectric project proposal by the French government over the waters of Lake Lanoux. From a geographical viewpoint, Lake Lanoux is situated on the southern slopes of the Mounts Pyrenees on the French territory.[603] Streams which originates from the French territory, run entirely in the French territory without crossing any of its boundaries before feeding the Lake Lanoux. The waters of the Lake emerge "only" by the stream called *Font-Vive*, which forms one of the upstream tributaries of the River Carol. The *Font-Vive* River flows approximately 25 kilometres from the Lake Lanoux within the French territory and crosses the boundary between Spain and France at the Puigcerda Town, from where it continues to flow through the Spanish territory for about 6 kilometres before discharging into the River Segre, which eventually flows into the Ebro River.

However, before joining the Spanish territory, the waters of the Carol River feed the Puigcerda Canal, which is a property of the Puigcerda Town. The French government planned to embark on a hydroelectric project that would use the waters of the Lanoux Lake, but Spain opposed the project, claiming that it would result in adverse effects on its interests and rights. Spain evoked the Treaty of Bayonne of May 26, 1866, which the country signed with France, and also the Additional Acts adopted the same day. To settle this matter, the

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[601] *Ibid*.

[602] *Lake Lanoux* arbitration case (*France v Spain*), 16 November 1957, 12 R.I.A.A., 281. (French version). Further information on the *Lake Lanoux* case available at *https://www.informea.org/sites/default/files/court-decisions/COU-143747E.pdf* , accessed on 19 July 2019; see also Lammers (note 413 above; 508-517).

[602] *Ibid*. Sands at 464.

[603] The geographic coordinates of Lake Lanoux are 42.589122° N and 1.903896° E. available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=%C3%89tang_du_Lanoux&params=42.589122_N_1.903896_E_region:FR_type:waterbody_source:frwiki* , accessed on 12 July 2019.

tribunal recourse to several general principles of international law, including those that touched the non-navigational uses of the international watercourses. Among the most essential points of the court's conclusions is the decision according to which the rights of downstream riparian countries should be respected, and also their interests should be taken into consideration in any upstream development occurring on a shared watercourse.[604] Lake Lanoux also made the point that states must negotiate arrangements in good faith. However, the arbitration fell short of stipulating that the states had to agree an arrangement.

The last contribution to be envisaged here is the *Corfu Channel* case,[605] which opposed the United Kingdome and the Republic of Albania. The origin of the case was an incident that took place in the Corfu Channel, territorial waters of Albania, as a UK warship struck mines in the Corfu Channel, causing a loss of the lives of many British officers. Based on the principle of harmless use of a territory, the ICJ concluded that every state should under international law not knowingly allow its territory to serve as the basis for acts that oppose the rights of other states. In the *Corfu Channel* case, the international legal responsibility of a state for any contravening act that occurred within its territory, and which has resulted in damages in another state (or party) was confirmed.[606] In 1949, as the ICJ pronounced its judgment, the Republic of Albania was recognised responsible for the explosion of these mines and for the damages and loss of lives that resulted.[607]

3.6 Conclusion

This chapter has surveyed the birth and evolution of the international law and principles that govern transboundary watercourses. Similar to the resource it regulates, the law of transboundary water resources is seen, under this chapter, to be in perpetual motion. Beginning with the general laws enacted by the ancient civilisations, this branch of law would be shaped during the era of the development of the law of navigation, and eventually wean itself into a separate discipline in the last century. It was in the second half of the last century that the international law and principles of transboundary water resources turned

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[604] *Trail Smelter* Arbitration, see note 580 above.

[605] *See Corfu Channel* case, (*U.K. v. Albania*), I.C.J. Reports 4, (1949), 3.

[606] *Ibid.*

[607] *Ibid.*

out to be more concerned in the non-navigational uses of transboundary water resources.[608] The investigations in this chapter have unearthed the distant and near factors that prevailed for the emancipation of this body of law. Factors such as the formation of state boundaries, the boom of the commercial navigation backed by the freedom of navigation principle, the inclusion of the sustainability concept in development planning, the environmental concerns globally are all some of the near element that have contributed to the formation of an international law to govern the use of transboundary watercourses. Contributions from diverse other sectors including the Roman and navigation laws, the works of the ILA and IIL, and the contribution made by some major international judicial decisions and arbitral awards. This chapter has also given a special attention to the evolution of the law of transboundary water resources that took place on the African continent because of its noteworthy particularities. The next step of this thesis will be the exploration of the substantial features of the doctrines, principles and rules that establish the current standards of the law of transboundary watercourses at the international level.

[608] Biswas (note 171 above; 18).

4 DOCTRINES, PRINCIPLES AND RULES ESTABLISHING STANDARDS CONCERNING THE INTERNATIONAL LAW OF TRANSBOUNDARY WATERCOURSES

4.1 Introduction

The previous chapter has traced back the birth and evolution of the laws, principles and doctrines of the international law of the transboundary watercourses from a historical perspective. This chapter sets out to introduce and discuss the doctrines, principles and rules that establish the current standards concerning the international law of transboundary watercourses from a substantial perspective. A broad but careful consideration of the fundamental features of this field of law is crucial in the trajectory of this thesis towards its aim, which is to assess the extent to which the legal framework that governs the Congo River and its transboundary tributaries has taken into consideration the climate change phenomenon. As discussed in the previous chapter, the adoption of the 1997 UNWCC was a relatively long process that aimed at filling the legal vacuum that prevailed at the international level concerning the non-navigational uses of transboundary watercourses, and which caused a general uncertainty as to States' rights and duties towards a transboundary watercourse. From being focused on single communities and states, the law of water resources has evolved progressively to the extent of covering multiple communities and states, and regulating complexe issues regarding the use of the transboundary watercourses shared by these communities and states. That is the reason why this chapter aims at discussing such doctrines, principles, and rules, and understanding how they apply to shared watercourses in general and the Congo watercourse in particular.

This chapter comprises four sections. The first section introduces the concept of doctrine and discusses some fundamental doctrines that emerged in the field of transboundary water law. The second discusses some fundamental principles of the law of transboundary watercourses. The third section introduces and discusses the 1997 United Nations Convention on the Non-Navigational Uses of the International Watercourses, before briefly overviewing the Convention on the Protection and Use of Transboundary Watercourses and International Lakes of the United Nations Economic Commission for Europe of 1992, which now is accessible to all the member states of the United Nations.

4.2 The major doctrines on transboundary watercourses

4.2.1 Introducing the concept of doctrines of law

Legal Doctrines are sometimes referred to as *theories* of law.[609] They are the currency of the law, even if they are somewhat dire to define.[610] Smith,[611] noticed that "Although any jurist has some idea of what a legal doctrine is about, it is more difficult to define it" Article 38 of the Statute of the International Court of Justice (ICJ) is recognised as the statement of the sources of international law. It provides:

> « The Court shall apply 1. International conventions, whether general or particular, establishing rules expressly recognised by the contesting States; 2. International custom, as evidence of a general practice accepted as law; 3. The general principles of law recognised by civilised nations; 4, Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law. This provision shall not prejudice the power of the Court to decide a case *ex aequo et bono* if the parties agree thereto. »[612]

This provision requires the ICJ to apply international conventions, whether general or particular, that establish rules expressly recognised by the contesting states. It also requires the Court to apply international customs that reflect a general practice broadly accepted as law, and any general principle of law which is recognised by the civilised nations. Doctrines, as argued by Tiller & Cross,[613] come from courts, as judicial opinions and decisions create standards, which the legal doctrines are made of.

Even if doctrines are rarely mentioned "as such" in water agreements, they are the back mind of states and lead the whole process of negotiation around the shared water resources. Despite the emergence of the principles and laws of the non-navigational

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[609] E.H. Tiller & F.B. Cross 'What is legal doctrine' (2006) 100 *Nw. UL Rev.* 517, 517.

[610] *Ibid.*

[611] See J.M. Smits 'What is legal doctrine? On the aims and methods of legal-dogmatic research' (2017): 207-228; V. Muraviov 'The Law of the European Union and the Legal Order of Ukraine: Mechanism of Interaction' (2016) 127 (1) *Act pro of Int Rel* 68, 72.

[612] Article 38 of the statute of the ICJ; concerning the ICJ.

[613] Tiller & Cross (note 609 above; 517).

uses of transboundary watercourses as it will be discussed further,[614] many states still hold their own "national" convictions regarding the watercourses they share with others, which convictions Allouche [615] referred to as *water nationalism*.

As discussed in previous sections, the increasing use of transboundary water resources and the widespread practice of water diversions by one riparian state on the expense of the others that characterised the last two centuries have generally compromised the peaceful relations among some riparian states across transboundary watercourses.[616] Claims and counterclaims often came from the riparian states that felt as if their water-related rights were scorned.[617] Faced with the absence of an international regime that could settle states disagreements concerning the non-navigational uses of the international watercourses, some doctrines emerged, that generally sought to fill the gap and address states' issue in this field.[618] It is believed that if there were in place a corpus of applicable laws and principles to govern transboundary watercourses at the international level, perhaps none of these doctrines would have emerged. Maybe, if they would have emerged, such an emergency would have been different from what it has been.

A few doctrines developed concerning the rights of riparian states vis-à-vis an internationally shared watercourse,[619] of which four are considered the most prominent.[620] These include *i.* the *absolute territorial sovereignty* doctrine, also referred to as the *Harmon doctrine*, *ii.* the *absolute territorial integrity* doctrine, iii. *the limited territorial sovereignty* doctrine, and iv. *the common management* approach. Though incompatible, and sometimes opposed, these doctrines are generally built on the concept of the state's sovereignty over natural resources.[621] As argued by McCaffrey,[622] the doctrines

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[614] See section 4.3 below.

[615] Allouche (note 370 above; 30).

[616] L. Teclaff (b) *Water Law in Historical Perspective* (1985), 2-4.

[617] Lipper (note 596 above); 18; Birnie & Boyle (note 386 above; 218).

[618] *Ibid*. Lipper; *Ibid*. Birnie & Boyle; O. Mcintyre (b) 'International water law: concepts, evolution and development' in A. Earle *et al. Transboundary Water Management. Principles and Practice* (2013) 60, 70-82.

[619] Lipper (note 596 above; 18); *Ibid*. Birnie & Boyle.

[620] McCaffrey (note 390 above; 84).

[621] Mcintyre (b) (note 619 above; 60).

[622] McCaffrey (a) (note 145 above; 111).

in this field of law were of great interest before the formation of the current international regime that applies to the non-navigational uses of the transboundary watercourses.

While the first water theory which developed, namely the Harmon doctrine, squarely undermined the rights of other sovereign riparian states as already mentioned, some of the latest theories, such as the common management doctrine, has undermined states sovereignty. This latest doctrine has embarked instead on a regime of community of good, which in substance is as questionable as was the Harmon doctrine. States trend to prevent water disputes by signing water agreements that recognise the mutual rights over a shared watercourse.[623] Also, on its course of development, the International water law has codified principles of shared waters that champions good neighbourhood while promoting cooperation between riparian states around shared water resources.

4.2.2 The absolute territorial sovereignty doctrine

It was during the last two decades of the nineteenth century that problems began between the USA and Mexico, two co-riparian states to the Colorado and Rio Grande Rivers.[624] What caused the two countries to enter into such a dispute was the growing water diversions practised by farmers on the US side, which took significant volumes of waters from the Rio Grande River, thus reducing considerably the flow of waters that usually reached Mexico. Mexico protested. M. Harmon, the then USA attorney general evoked for the first time the absolute territorial sovereignty doctrine that ained at giving an answer to Mexico's protest.[625]

As discussed earlier,[626] the doctrine of *absolute territorial sovereignty* also referred to the *Harmon doctrine*, claims complete liberty of a riparian state to utilise, as it

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[623] For instance the conflicts between India and Pakistan, to see generally P. Lyon *Conflict between India and Pakistan: an encyclopedia* (2008); Conflict between Austria and Germany (1950s); and between Chile and Bolivia (1920s), See water conflict chronology at *http://www.worldwater.org/conflict/map/.* Accessed on 24 June 2019.

[624] For instance, at the end of the nineteenth century, 1528 canals diverted waters from the Colorado River and its tributaries against 1,074 before the year 1880. See generally the USA International boundary commission *Report of the Boundary Commission Upon the Survey and Re-Marking of the Boundary Between the United States and Mexico West of the Rio Grande, 1891-1896*. Available at *https://digital.library.unt.edu/ark:/67531/metadc1030/m1/1/* accessed on 12 July 2019.

[625] *Ibid*. USA International boundary commission.

[626] See section 3.3.4 above.

needs the portion of a transboundary watercourse that passes through its territory, regardless of the consequences that might be caused to other riparian countries. The doctrine also claimed that impactful water utilisations could be undertaken without prior consultation with a downstream country likely to be negatively affected.[627]

Even though the USA is the country where the Harmon doctrine was conceived, history recalls that this country would neither apply nor consider this doctrine in the state's treaty practice.[628] Although some US states have time to time argued to possess absolute sovereignty over the section of a transboundary watercourse located in their territories, the USA federal government has never supported Harmon's theory. The "1906 Convention concerning the equitable distribution of the waters of the Rio Grande for irrigation purposes", for instance, signed between the USA and Mexico, was based on the approach of "equitable and acceptable use of the shared watercourse".[629] In addition, the "1909 Treaty between the UK and the USA concerning the boundary waters and questions arising along the boundary between Canada and the USA" signed between the USA and Canada was substantially inconsistent with the Harmon doctrine, but in line with the "limited territorial sovereignty doctrine" to be discussed below.[630]

At the end of the nineteenth century and the two first decades of the twentieth century, a few scholars gave support to the Harmon doctrine.[631] Nonetheless, the doctrine has not received any significant support ever since. The Harmon doctrine has hardly reflected in dispute resolution, nor did states evoke it during diplomatic discussions concerning transboundary water resources.[632] Be it that Attorney-General Harmon lived at

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[627] Rahaman (note 374 above; 209).

[628] *Ibid*. Rahaman; McCaffrey (a) (note 145 above; 76).

[629] See Artciles I and II of the "1906 Convention concerning the equitable distribution of the waters of the Rio Grande for irrigation purposes", available at *https://iea.uoregon.edu/treaty-text/1906-usmexicoriograndeentxt* , accessed on 2 August 2019.

[630] See the 1909 Treaty between the UK and the USA, available at *https://legacyfiles.ijc.org/tinymce/uploaded/Boundary%20Waters%20Treaty%20of%201909_3.pdf*, accessed on 2 August 2019.

[631] For supporting scholars, see for instance C.G. Fenwick *International Law* 4th ed. (1965), 391; H.W. Briggs *The law of nations: cases, documents, and notes* (1952) 22. *App Cent Cr;* H.A. Smith *The economic uses of international rivers* (1931) 108. *PS King & Son*, 145.

[632] *Ibid*. Smith.

the end of the century in which he expressed his opinion, he would have perhaps, had a different opinion. However, despite its shortcomings, the Harmon doctrine is seen as the event that caused the emergence of the customary international law of transboundary watercourses,[633] which for Tarlock,[634] developed as a reaction to the Harmon doctrine.

4.2.3 The absolute territorial integrity doctrine[635]

Like the Absolute territorial sovereignty doctrine, *the absolute territorial integrity doctrine* was based also on the concept of state sovereignty. While the Harmon doctrine favoured upstream states, the absolute territorial integrity doctrine emerged as its exact opposite and favoured the downstream states on the expanse of the upstream ones.[636] The core substance of the *Absolute territorial integrity* doctrine is the prohibition of any water development to occur in an upstream state, which would interfere with the natural flow of a transboundary watercourse. The doctrine confers the right to a downstream riparian state to demand the continuation in full of a natural flow of a watercourse from an upstream riparian state, both in quality and quantity terms.[637] However, the shortcoming of the *Absolute territorial integrity* doctrine was its lack of recognition of equal water rights to upstream and downstream states.

The *Absolute territorial integrity* doctrine seems to have derived from the common law doctrine of riparian rights.[638] The riparian rights doctrine claimed that an upstream riparian state should let the waters flow naturally downstream without any interference thereto, be it in quantity, or in its quality terms. The United Kingdom and the USA for instance already incorporated the riparian rights doctrine in their domestic water

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[633] Bourne (note 356 above; 215).

[634] Tarlock (note 392 above; 189).

[635] See details in F.J. Berber *Rivers in International Law* No 46 (1959) 19-22; Lammers (note 413 above; 18-20).

[636] On the Harmon doctrine, see McCaffrey (a) (note 145 above; 76-111); M. Zeitoun 'The relevance of international water law to later-developing upstream states (2015) 40 (7) *Wat Int'l* 949, 951; O. McIntyre (c) 'The emergence of an "ecosystem approach" to the protection of international watercourses under international law' (2004) 13 (1) *Rev of Eur Com and Int'l Env Law* 1, 1-2.

[637] McCaffrey (a) (note 145 above; 117); Dellapenna (note 24 above; 208); A. Rieu-Clarke *International Law and Sustainable Development: Lessons from the Law of International Watercourses* (2005), 147.

[638] Teclaff (a) (note 197 above; 20); D.H. Getches *Water Law in a Nutshell* 4 ed. (1997), 15–55.

laws.[639] Similar to the doctrine of riparian rights, the doctrine of absolute territorial integrity tolerates only minimal water uses by upstream states.[640] The riparian rights doctrine evolved and recognised eventually the right to each riparian state to use reasonably a transboundary watercourse.

The 1911 Madrid Declaration recognised the Riparian States doctrine, which it sought to establish as a rule of international water law. In its statement of reasons, the 1911 Madrid Declaration recognised:

> "The Riparian States with a common stream are in a position of permanent physical dependence on each other which precludes the idea of the complete autonomy of each State in the section of the natural watercourse under its sovereignty."[641]

Some scholars have argued that there was no practical need for an antidote-like doctrine, given that the upstream countries did not show any support to the Harmon doctrine, as mentioned earlier.[642] Therefore, by constructing an antidote to the Harmon doctrine, with an imbalanced approach, the inventors of the Absolute Territorial Integrity doctrine created a new problem, which this time was the favour that the theory ensured to the downstream states.[643] Unlike its predecessor, this doctrine received broad support, especially from downstream riparian states. Countries such as Argentina, Bangladesh, Egypt, Spain, and many Arab states have invoked the principle of absolute territorial integrity during water disputes.[644] To these countries, the doctrine was more as a 'tool of advocacy' rather than a legal principle that had substantial features, with potential to assist states to resolve water conflicts.[645]

The Republic of Egypt is one of the most consistent supporters to the Absolute territorial sovereignty doctrine, and one can understand why: up to 96 percent of

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[639] The courts of justice in the United States and the United Kingdom held that the riparian lands of a land contiguous to a stream, were the only entitled to the use of the waters of the said stream, as much as they needed for domestic purposes; Teclaff (a) (note 197 above; 20); L.A. Teclaff (f) 'Fiat or custom: the checkered development of international water law' (1991) 31 *Nat Res J* 45, 63.

[640] Teclaff (a) (note 197 above; 20).

[641] Paragraph 1 of the Declaration of Madrid of April 20, 1911".

[642] See for instance P. Birnie & A.E. Boyle *International Law and the Environment* (1992), 219.

[643] *Ibid*.

[644] See Mcintyre (b) (note 619 above; 64).

[645] *Ibid*. at 44; McCaffrey (a) (note 145 above; 129–130).

the waters that flow through the Nile River on the Egyptian territory originates from outside the country, whereas the country's survival depends on the waters of the Nile for at least 95 percent.[646] That is the reason why the country could only be satisfied with a doctrine that comforts the rights of downstream riparian, even if, in its practice of water treaties, Egypt has concluded agreements that took a more balanced position vis-à-vis its upstream co-riparian states to the Nile River.[647] The current tussle between Egypt and Ethiopia regarding the Renaissance Dam sufficiently illustrates the Egyptian support to the doctrine of absolute territorial integrity.[648]

The Republic of Pakistan also offers an example that allows glimpsing the possibility that lies within a country to evolve from one initial doctrinal position to the other.[649] Pakistan is the downstream riparian state of the Indus River,[650] which crosses China, India, and Afghanistan upstream.[651] During some initial diplomatic discussions with India, Pakistan appeared to be in line with the absolute territorial integrity doctrine. Soon after the discussions, the country turned around and proposed the two countries may agree upon an 'equitable apportionment' of all the streams they shared.[652]

Even if this doctrine received slightly more support than its predecessor, it was proven not to be just and equitable.[653] Making the connection between the Harmon and the Absolute Territorial Integrity doctrines, McCaffrey[654] concluded that both were factually myopic and legally 'anarchic', because they ignored other states' rights on a shared watercourse. Besides, the two doctrines ignored that sovereignty entailed both rights

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[646] A.H. Garretson 'The Nile Basin' in A.H. Garretson *et al.* (eds) *The Law of International Drainage Basins* (1967), 272.

[647] McCaffrey (a) (note 145 above; 131); *Ibid*. Garretson; Mcintyre (b) (note 619 above; 64).

[648] On the Renaissance Dam, see Nasr (note 311 above); see also Cascão (note 311 above).

[649] McCaffrey (a) (note 145 above; 130).

[650] *Ibid*.

[651] H. Rehman & K. Ahmed *Indus Basin River System-flood and Flood Mitigation* in *8th International River Symposium* (2005), 2-11.

[652] R.R. Baxter 'The Indus Basin' in A.H. Garretson *et al.* (eds) *The Law of International Drainage Basins* (1967) 451, 454.

[653] See Mcintyre (b) (note 619 above; 63).

[654] See Baxter (note 653 above; 135.)

and duties. Birnie & Boyle[655] concluded that they were both useless because they received only limited support whether from states practice, or the jurisprudence and the scholars.[656]

Following these two unsuccessful doctrinal attempts, some other conceptual frameworks evolved progressively. In most of the cases, the new doctrines including the limited territorial sovereignty and the community of interest doctrines built on the ashes of these two preceding failures.

4.2.4 The limited territorial sovereignty doctrine

The third theory to discuss is the *limited territorial sovereignty* doctrine, sometimes referred to as the doctrine of *equitable utilisation,* or also the "sovereign equality and territorial integrity" doctrine. The *limited territorial sovereignty doctrine* entitles each riparian state, whether upstream or downstream, to equitably and reasonably use the waters of a transboundary watercourse that flow through its territory, without upsetting the right to use the same flow of waters by the other riparian states.[657] In other words, all riparian states of an international watercourse have the same rights (and duties) towards its flows. That is the reason why some authors have seen in this doctrine a conciliation between the absolute territorial sovereignty and the absolute territorial integrity doctrines.[658] For Schroeder-Wildberg,[659] the principles of equitable and reasonable utilisation of shared water resources, and the obligation not to cause significant harms were integral parts of the *limited territorial sovereignty doctrine*.

After the broad recognition of the inapplicability of the two precedent doctrines, states resorted to the United Nations Charter and treaties practice to define a new

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[655] Birnie & Boyle (note 386 above; 332).

[656] The ICJ, for instance, unequivocally rejected the absolute territorial integrity doctrine in the 1957 *Lac Lanoux* case, thus showing its inability to incorporate the international jurisprudence. See Mcintyre (b) (note 619 above; 64); Salman & Uprety (note 384 above; 12).

[657] *Ibid*. Salman & Uprety; *Ibid*. Mcintyre (b) at 64-66.

[658] *Ibid*. Salman & Uprety; *Ibid*. Mcintyre.

[659] Wildberg (note 422 above; 14).

doctrine that would recognise states' equality towards shared water resources.[660] The *limited territorial sovereignty* doctrine was the result of this quest. That is why, it is generally believed that the *limited territorial sovereignty* doctrine has its origins in the principle of sovereign equality of states, as set out in paragraph 1 of Article 2 of the United Nations Charter. Article 2(1) of the United Nations Charter provides:

> "The Organisation and its Members, in pursuit of the Purposes stated in Article 1, shall act in accordance with the following Principles. 1. The Organisation is based on the principle of the sovereign equality of all its Members." [661]

Under the *limited territorial sovereignty doctrine*, the exclusive rights which are traditionally claimed by both the upstream and the downstream states find themselves restricted by the recognition of equal rights to both groups.[662] Both the genesis and formulation of this doctrine have caused it to be seen as the prevailing theory in the field of transboundary watercourses.[663]

From a treaties practice perspective, the *limited territorial sovereignty* doctrine was adopted in most of the treaties passed in recent years. Examples here may be the 1995 Agreement on the cooperation for the sustainable development of the Mekong River basin,[664] the 1995 SADC protocol on shared watercourse systems,[665] and the 2002 framework agreement on the Sava River basin, which have all made express reference to

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[660] P. Beaumont 'The 1997 UN Convention on the Law of Non-navigational Uses of International Watercourses: its strengths and weaknesses from a water management perspective and the need for new workable guidelines' (2000) 4 (16) *Int'l J'l of Wat Res Dev* 475, 476-477.

[661] Article 2(1) of the United Nations Charter.

[662] Rahaman (note 374 above; 210); Mcintyre (b) (note 619 above; 64).

[663] Tanzi & Arcari (note 279 above; 136); Rieu-Clarke (note 638 above; 148).

[664] Articles 4, 5, 6 and 7 of the 1995 "Agreement on the Cooperation for the Sustainable Development of the Mekong River basin". Article 4, for instance, provides on the "Sovereign Equality and Territorial Integrity", and Article 5 on "Reasonable and Equitable Utilisation".

[665] See Article 1 (2) of the 1995 SADC Protocol on Shared Watercourse Systems.

the limited sovereignty doctrine.[666] Apart from states practice, a good majority of scholars have shown support to this doctrine, in spite of a disapproval from some.[667]

4.2.5 The common management/community of interests doctrine

The *common management*/*community of interests* doctrine is the last theory to be discussed in this section. This doctrine envisions international river basins as highly integrated and cooperative entities, whereby shared natural resources including waters are not approached from the traditional rudimentary upstream-downstream states dichotomy fashion, but rather, as natural units of integrated and interdependent natural resources and living things. Under the *community of interests* doctrine, river basins have to be regarded as a whole integrated thing, and thereby managed accordingly.[668] Water resources belong to the community and are divided among all the river basin states by way of a treaty. For Allouche,[669] the basin states thus cooperate between them on a multitude of issues, including water management, with the view of maximising the collective good not only of the water resources within the river basin but also the good of its dwellers and of the ecosystems that are found there.

The community of interests doctrine was given an early authoritative endorsement as far back as 1929, by the PCIJ in the *River Oder case* mentioned above.[670] Though the case concerned issues of rights of navigation, the judgment of the PCIJ concluded as follow:

> "This community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian

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[666] See Articles 7, 8, and 9 of the "2002 Framework Agreement on the Sava River basin" respectively 1/ on the reasonable and equitable utilisation of the shared water resources; 2/ the transboundary impact; 3/ the No-harm principle. See Rahaman (note 374 above; 170).

[667] See early debates and scholars positions in J. Andrassy 'Les relations internationales de voisinage' (1952) 79 *Rec des Cs* 116, 118; Berber (note 636 above; 25-40); Lipper (note 596 above; 30-32); McCaffrey (a) (note 145 above; 147-148).

[668] For further information on this doctrine, see Rahaman (note 374 above; 210); Mcintyre (b) (note 619 above; 67-70).

[669] Allouche (note 370 above; 15).

[670] The *Oder River* Case (note 275 above; 27); see also section 3.5.5 above.

> states in the use of the whole course of the river and the exclusion of any preferential privilege of anyone riparian state in relation to the others."[671]

In addition to the PCIJ, the doctrine received significant support from scholars, including the ILA.[672] Some regional organisations also adopted the "community of interest" theory, among which the European Union, for which, argued Moellenkamp[673], the principle was the core spirit of the community concerning the shared waters of the community. Likewise, the provision of Article 2 of the 1995 "Protocol on Shared Watercourse Systems of the SADC" is based on the community of interest theory.[674]

From the perspective of a state, old and recent treaty practices have revealed significant adherence to the community of interests doctrine. The "1905 Treaty of Karlstad between Sweden and Norway" provides in its Article 4 the following:

> "The lakes and watercourses which form the frontier between the two states or which are situated in the territory of both or which flow into the said lakes and watercourses shall be considered as common."[675]

Article 1(2) of the 1992 "Agreement on the Establishment of a Permanent Water Commission between Namibia and South Africa" provides among other things that the Commission's objective is: "to act as a technical adviser to the Parties on matters relating to the development and utilisation of water resources of common interest to the Parties".[676]

The *community of interests* doctrine recommends the establishment of basin-wide mechanisms to formulate and implement basin-wide policies that aim at managing a

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[671] *Ibid*.

[672] See section 3.5.4 above.

[673] S. Moellenkamp 'The "WFD-effect" on upstream-downstream relations in international river basins? Insights from the Rhine and the Elbe basins (2007) 4 (3) *Hydr & E Sys Sc Disc* 1407, 1420.

[674] Article 2 of the 1995 SADC Protocol on Shared Watercourses: "The Community members undertake to respect and apply the existing rules of general or customary international law relating to the utilisation and management of the resources of shared watercourse systems and, in particular, to respect and abide by the principles of community of interests in the equitable utilisation of those systems and related resources."

[675] See texts in F.J. Berber *Rivers in International Law* (1959), 24. Search of the original treaty revealed unsuccessful.

[676] *Ibid*.

basin's resources. Allouche[677] explains that under this doctrine, the basin states would cooperate on a multitude of issues, including water management, ecosystem protection, to name but a few, with the view of maximising the collective good.[678] The management of transboundary watercourses in the Economic Commission for Europe zone seems to have followed this recommendation.[679]

Despite being considered (to some extent) as an idealistic approach by some modern opinions, the *community of interests* doctrine received support from the ICJ in the *Gabčíkovo-Nagymaros* case, in 1997.[680] In this case, the ICJ reaffirmed the relevance of the "community of interest doctrine" by recognising the existence of a community of interest in all the uses that may be made of any international watercourse.[681] Referring to the earlier *River Oder* case, the ICJ further declared:

> "Modern development of international law has strengthened this principle for non-navigational uses of international watercourses as well, as evidenced by the adoption of the Convention of 21 May 1997 on the Law of the Non-Navigational Uses of International Watercourses by the United Nations General Assembly."[682]

Based on the community of interest principle, the Court then concluded:

> "Czechoslovakia, by unilaterally assuming control of a shared resource, and thereby depriving Hungary of its right to an equitable and reasonable share of the natural resources of the Danube ... failed to respect the proportionality which is required by international law."[683]

McCaffrey[684] stressed that the above statement supports the possibility for the *community of interest* doctrine to be referred to as a legal principle that forms the basis for the formation

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[677] Allouche (note 370 above; 15).

[678] *Ibid*.

[679] M. Fitzmaurice & O. Elias *Watercourse Cooperation in Northern Europe–A Model for the Future* (2004), 14.

[680] In the *Gabčíkovo-Nagymaros* case (*Hungary v. Slovakia*), see ICJ Judgement Reports (1997) 7.

[681] Allouche (note 370 above; 41); see section 3.5.5 above.

[682] See note 663 above concerning the *Gabčíkovo-Nagymaros case.*

[683] *Ibid*. ICJ Judgement reports 1997, 7.

[684] McCaffrey (a) (note 145 above; 152).

of substantial obligations for riparian states.[685] To a certain extent, this common management theory is gradually becoming a standard due to the growing recognition in the international law of the physical and ecological unity of river basins.[686] The modern types of environmental challenges, the impacts of climate change on waters and other natural resources, and the biological interdependences of ecosystems, all dictate new outlooks on the international law of the transboundary watercourses and river basins.

The ongoing development of the so-called "ecosystems approach" for the protection of the environment, including water resources seems to carry a glimmer of hope in this regard. Such an approach is likely to catalyse the speed of the legal recognition of the physical and ecological unity of river basins both at the international and national levels, and by doing so, states may see the opportunity to place more emphasis on the establishment of joint management institutions.[687] The 1997 UNWCC that will be discussed in ample detail later,[688] actively encourages watercourse states to enter into interstates agreements for arrangements concerning the management of shared water resources.

4.2.6 The connection between states sovereignty and water resources

As explains Hunter,[689] a thoughtful understanding of the above doctrines requires questioning the two crucial concepts of "territorial sovereignty" and "territorial integrity" which were already explained above.[690] Attempts to approach the transboundary water resources of a river basin as a common good are generally hampered because of the conception of states regarding their national sovereignty over water resources.

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[685] *Ibid*.; UN *Summaries of Judgments, Advisory opinions and orders of the Permanent Court of international Justice (2012)* available at *http://legal.un.org/PCIJsummaries/documents/english/PCIJ_FinalText.pdf* , accessed on 18 June 2019.

[686] Mcintyre (b) (note 619 above; 69).

[687] *Ibid*.

[688] See section 4.4. below.

[689] D. Hunter *et al. International environmental law and policy 3 ed* (2007), 875.

[690] See sections 2.3.5 , 4.2.2 , and 4.2.3 above.

There are worldwide 310 international river basins, through which rivers that cross over state's territorial boundaries are shared between many sovereign states.[691] These boundary-crossing rivers are exceptional types of resources because they have different sections thereof under different state's sovereignties.[692] Therefore, it seems reasonable to a state to develop a passionate relationship vis-à-vis its water resources, which it considers as a national asset, due to the fact that such a resource is located within its national territorial limits. Having understood this, it becomes natural to find that a state and its people would try by all means to apply to such a resource their privilege of possession and duty of protection. In these conditions, States' relationships with their water resources lead to what Allouche[693] qualified as "water nationalism".

The whole problem of sharing international watercourses is that, in exercising its national sovereignty over a shared water resource, a riparian state should consider it as a national obligation to respect and preserve the right of the other riparian state vis-à-vis the same water resource. In this view, a State's approach to the concept of sovereignty will largely determine its choice vis-à-vis the legal principles to govern its shared water resources. Mcintyre[694] noticed that States' trend was to agree with one principle and disagree with the other in order to preserve what they consider as their national interests vis-à-vis an international watercourse. For the same author, States by doing so often seek to turn the situation to their advantage,[695] under the cover of states sovereignty over water resources, for which the 1997 UNWCC has eventually represented the first attempt of codification in the field of the non-navigational uses of transboundary water resources.

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[691] Mccracken & Wolf (note 23 above; 2).

[692] See L. Deblez 'Du territoire dans ses rapports avec l'Etat' (1992) 39 *Rev Gen du Dr Int Pub,* 46.

[693] Allouche (note 370 above; 33).

[694] Mcintyre (b) (note 619 above; 60).

[695] *Ibid.*

4.3 Principles of the international law of transboundary watercourses

4.3.1 Introducing the "principles of law"

Article 38 (3) of the Statute of the ICJ evoked above, enjoins the court to: "apply the general principles of law recognised by civilised nations".[696] A *principle of law* is commonly defined as: "an authoritative legal standard of general application, requiring either action or inaction, and used by courts and administrative tribunals as a norm in deciding the legal significance of the facts presented in particular cases".[697] Unlike the *rule of law* that is for the most practical and binding, the principles of law are general, in the sense that they potentially apply to all members of a community and indistinctly through the activities they undertake.[698] Whereas some principles reflect customary law, others may reflect some emerging legal obligations, or otherwise, be recognised as legal principles which are still at a lesser development status.[699] Principles of law are sometimes used in courts of justice, to decide which one of two or more contending applicable rules should be applied in particular cases.[700]

In the history of treaties, general principles of law used to be proclaimed in the preambles of the instruments.[701] It was only recently that these general principles started to be incorporated into the operative parts of the treaties and conventions.[702] Such incorporation constitutes sufficient proof of the increasing importance that states have given to the principles of law. Both Articles 3 of the UNFCCC and Articles 3 of the 1992 Convention on Biodiversity, are a few examples that illustrate the incorporation of a

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[696] See article 38(3) of the statute of the ICJ.

[697] The issue of what constitutes a "principle of law" is one of the most unsettled questions in the international law filed as evidenced by the many interpretations that are given to Article 38.1(c) of the Statute of the ICJ. See I. Brownlie *Principles of Public International Law* (2003), 15–19.

[698] "A 'rule of law is essentially practical and, moreover binding, whereas a principle 'express a general truth, which guides actons, serve as a theoretical framework for the various acts of human life and society, and the application of which produces to the reality a given consequence." See Gentini case (*Italy vs Venezuela*) MCC (1903) cited in Sands *Principle of International Environmental law* 2 ed. (2003), 231.

[699] Sands (note 307 above; 232).

[700] *Ibid*. Sands; J. Delaney *Learning Legal Reasoning: Briefing, Analysis, and Theory* (1987), 6.

[701] *Ibid*.

[702] *Ibid*.

treaty's principles in the body of the treaty.[703] Under climate change circumstances, it is critical for water law principles to offer a certain degree of flexibility in their observance and application.[704] This is because of the uncertainties that accompany climate change. Water law principles that are enshrined in the 1997 UNWCC are briefly introduced and discussed below, followed with concluding paragraphs that offer a discussion concerning the considered principle with respect to the current context of climate change.

Three "substantive" principles and a few "procedural" principles incumbent upon riparian states of transboundary water systems are discussed below. The "substantive" principles include the obligation to equitably and reasonably utilise an international watercourse; the obligation not to cause significant harm to other riparian states and the obligation to cooperate. The "procedural" principles include the obligation to regularly exchange data and information, the obligation to notify the other riparian states concerning planned measures with possible adverse effects on the shared water resource, and the obligation to peacefully settle water-related disputes.

4.3.2 The principle of equitable and reasonable utilisation

4.3.2.1 Statement of the principle

The principle of equitable and reasonable utilisation of international watercourse is a user-oriented obligation, which entitles riparian states with the right (and the duty as well) to a reasonable and equitable share of a transboundary water resource.[705] The waters in concern are those the riparian state would draw within its own territory.[706] Whether equated with the doctrine of limited territorial sovereignty,[707] or perceived as "operationalising the

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[703] For instance, Article 3 of the CBD provides: "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."

[704] See McCaffrey (a) (note 145 above; chapter 5).

[705] See Article 4 of the 1966 Helsinki Rules, and Article 5 of the 1997 UNWCC.

[706] *Ibid*.

[707] Dellapenna (note 24 above; 270); C. Okidi 'Nile waters: The threat of war is not justifiable in modern times' (2014) 1/2 (44) *Env Pol and L* 176, 178.

concept of sustainable development,"[708] the principle of equitable and reasonable utilisation remains to date the “fundamental rule”, the "key principle", and the "cornerstone" of the international law of transboundary watercourses.[709]

Article 5 of the 1997 UNWCC titled “Equitable and reasonable utilisation and participation” provides:

> “1.Watercourse States shall in their respective territories utilise an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilisation thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse. 2. Watercourse States shall participate in the use, development, and protection of an international watercourse in an equitable and reasonable manner. Such a participation includes both the right to utilise the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention.” [710]

McCaffrey[711] claims the principle to be born of the many cases in which the United States Supreme Court had to decide regarding interstates apportionment of shared water resources. The USA decisions were then supported by some federal courts across the globe, early in the 20th century.[712]

The first significant study to focus on the legal implications of sharing transboundary watercourses was undertaken by Professor H.A. Smith from London, which study was published in a book entitled ‘*The Economic Use of International Rivers*, released in 1931.[713] After reviewing and studying several water treaties and transboundary water

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[708] P.K. Wouters & A. Rieu-Clarke ‘The role of international water law in sustainable development’ (2001) 12 (15) *Wat L* 281, 284.

[709] McIntyre (a) (note 387 above; 12).

[710] Artcile 5 of the 1997 UNWCC.

[711] McCaffrey (a) (note 145 above; 384).

[712] *Ibid*. McCaffrey for other court’s cases; concerning the USA cases, see for instance *Kansas v. Colorado*, 206 U.S. 46 (1907); available at *https://supreme.justia.com/cases/federal/us/206/46/*, and *Wyoming v. Colorado*, 259 U.S. 419 (1922), available at *https://supreme.justia.com/cases/federal/us/259/419/* .

[713] Book review available at *https://muse.jhu.edu/article/625661/pdf* , accessed on 24 June 2019.

conflicts, Smith noticed the existence of a broad recognition of water rights to downstream states, and consistent reference to the principle of equitable utilisation.[714] After being practised by states in water treaties in several regions of the globe, the principle took its first steps towards a codification under the ILA New York Resolution of 1958.[715] The second Article of the 1958 New York Resolution maintained the right of a co-riparian state to be entitled to a reasonable and equitable share from any benefit derived from the use of a shared water resource.[716] The principle would be later discussed in Kyoto, in 1964,[717] before being engraved in the 1966 Helsinki Rules.

The *equitable and reasonable utilisation principle* was formulated using a flexible style. There was no normative definition attached to it. Some authors have viewed in such a flexibility a weakness in the principle, in particular after the application of the principle in the entire regime of the 1997 UNWCC.[718] Yet, others have argued that such flexibility was indispensable in the 1997 UNWCC, given the framework nature of this convention.[719] A framework convention needs to be flexible enough in order to be applied in a variety of circumstances.

Adjacent to Article 5 is Article 6, which provides factors that are relevant to equitable and reasonable utilisation.[720] In providing for these factors, this provision has

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[714] Biswas (note 171 above; 13-14).

[715] See section 3.3.3 above concerning the ILA New York Resolution of 1958.

[716] Section 2 of the New York Resolution of 1958 provides: "Except as otherwise provided by treaty or other instruments or customs binding upon the parties, each co-riparian State is entitled to a reasonable and equitable share in the beneficial uses of the waters of the drainage basin. What amount to a reasonable and equitable share is a question to be determined in the light of all the relevant factors in each particular case."

[717] See generally ILA *Berlin Conference Report* (2004).

[718] For early opinions, see Wouters *et al. Sharing transboundary waters: An integrated assessment of equitable entitlement: The legal assessment model* (2005); Kaya I, Equitable Utilisation: The Law of Non-Navigational Uses of International Watercourses (2003); ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994). 96-100.

[719] Rieu-Clarke *et al.* (note 277 above; 12); Tanzi & Arcari (note 279 above) ; A. Rieu-Clarke A & F.R. Loures 'Still Not in Force : Should State Support the 1997 UN Watercourses Convention ? (2009) 18(2) *Rev of Eur Com & Int'l Env L*, 185, 191.

[720] See Article 6 of the 1997 UNWCC.

played a pivotal role in the development of the customs of international watercourses, especially in matters concerning environmental protection.[721]

Besides its endorsement in Article 5 and the related provisions of the 1997 UNWCC, the principle is present in most of the modern multilateral instruments and declarations on the transboundary watercourses. For instance, Article 2.2(c) of the Convention of the United Nations Economic Commission for Europe (UNECE) on the Protection and Use of Transboundary Watercourses and International Lakes of 1992; also, Article 2 of the 1995 SADC protocol on shared watercourses, for instance, provide for the equitable and reasonable utilisation principle.[722] The 1966 Helsinki Rules and the 2004 Berlin Rules also have included the principle, in its Articles 4, 5, 7, 10, and 29 (4), and in Articles 10.1, 12, 13, 14, and 16.[723]

4.3.2.2 The sub-concept of "equitable utilisation"

The concept of equitable utilisation refers to *equity*, which is a well-incorporated concept in international environmental law. In its broad sense, equity refers to the quality of being fair or impartial.[724] Besides its reference by the UN law of the sea,[725] the concept of equity is present in numerous multilateral treaties including the 1992 Convention on Biological Diversity (CBD).[726] Article 1 on the aims of the CBD prescribes "the fair and equitable

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[721] Rieu-Clarke *et al.* (note 277 above; 121).

[722] The UNECE is one of the five regional commissions of the United Nations Economic Commission for Europe (UNECE) worldwide. Further information on the UNECE available at *https://www.unece.org/info/ece-homepage.html. a*ccessed on 12 October 2019; The Provisions of the 1997 UNWCC that refer to the principle include Article 6, 7, 15, 16 and 17.

[723] See relevant provisions in the 1966 Helsinki Rules and the 2004 Berlin Rules.

[724] The Synonyms of equity are: equitableness, fairness, disinterest, justness, impartiality, fair-mindedness, even-handedness, probity, objectivity, and justice. available at *http://www.dictionary.com/browse/equity* , *a*ccessed on 20 of June 2019.

[725] Equity is mentioned in the following provisions of the "United Nations Convention on the Law of the Sea preamble", a part from its Preamble: Articles 59, 69, 70, 74, 76, 82. Existing treaties have specified the "equitable utilisation" concept within the context of delimitation of maritime boundaries of continental shelves and exclusive economic zones.

[726] Article 1 of the Convention on the Biological Diversity, fore instance, prescribes: "The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity. the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization

sharing of the benefits arising out of the utilisation of genetic resources". In the field of shared water resources, "equity" has to be seen through the lenses *of* both *Equitable Utilisation* of shared natural resources and *equitable share of the costs and benefits* that may arise from the management of shared watercourses.[727]

In general, there are two types of equity that deserve particular attention.[728] These are the *intergenerational* and *intragenerational equity*.[729] *Intergenerational equity* considers equity in its verticality, meaning that humans have to be being fair or impartial towards the future generations because we 'hold the natural and cultural environment of the Earth in common with both the members of the past, the present, and the future generations.[730] The *Intragenerational equity* approaches equity in its horizontality. It considers that humans have to be fair or impartial towards all the generations that are presently on earth.[731] The general wording of Article 5 and 6 of the 1997 UNWCC suggests that the convention has taken into account the two dimensions of the "Equity" concept.

4.3.2.3 Sub-concept of "reasonable utilisation"

Similar to the ambiguity noticed above concerning the concept of equity, there seems to also be some ambiguity in the determination of what constitutes "reasonable utilisation"

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of genetic resources"; See the Japan Branch Committee on CC *The Legal Principles relating to Climate Change Preliminary Issues on the Methodology and Scope of the Work Report* (2009), 14-15, available at *http://www2.kobe-u.ac.jp/~akihos/ja/download_doc/ILAJapanBranchPaperJuly09.pdf*, acessed on 7 June 2019).

[727] A. Klaphake & O Voils 'Cooperation on international rivers from an economic perspective: the concept of benefit-sharing' in W. Scheumann & S. Neubert *Transboundary water management in Africa: challenges for development cooperation* Vol. 21 (2006), 107-108; UNWaters *Sharing benefits, sharing responsibilities* (2008), 3.

[728] For discussions on the types of equity in international water law, see V. Lowe 'The Role of Equity in International Law' (1989) 12 *Aus YB of Int'l Law*, 56 ; for a debate on the concept of equity under climate change, see generally C. Okereke & P. Coventry 'Climate justice and the international regime: before, during, and after Paris' (2016) *7*(6) *Wil Interd Rev Cl Ch* 834.

[729] For discussions on the types of equity in international water law, see *Ibid*. Lowe; see also S. Caney 'Climate change, intergenerational equity, and the social discount rate' (2016) *The Eth Und of Cl Ec* 53-76.

[730] J.M. Longunza *The Contribution of developing countries in the global effort to tackle climate change: analysis of the transition from the Kyoto Protocol to the Paris Agreement* (unpublished LLM thesis, University of KwaZulu-Natal, 2016), 51.

[731] Lowe (note 729 above; 56).

and what does not.[732] "Reasonable" is broadly defined as an action based on, or using good judgment and, therefore, fair and practical.[733] Reasonable utilisation of a shared watercourse is a utilisation that is based on sound judgments. In the field of shared waters, "reasonable" appears to be a subjective concept, because the use of shared waters, which a riparian state may see as "reasonable" might be seen as "non-reasonable" for another riparian, and vice versa. Therefore, the determination of the reasonableness concerning the use of a transboundary watercourse will necessitate the existence of active water cooperation between the riparian states, to help these agree on standards regarding what can be regarded as reasonable utilisation of a shared water resource.[734]

The ILC briefly explains the *modus operandi* of a state's claim for unreasonableness regarding the utilisation of a shared watercourse:

> "The plaintiff state starts with the presumptive rule in its favour that every State is bound to use the waters of rivers flowing within its territory in such a manner as will not cause substantial injury to a co-riparian State. Having proved such substantial injury, the burden then will be upon the Defendant State to establish an appropriate defence, except in those cases where damage results from extra-hazardous pollution and liability is strict. This burden falls on the Defendant State by implication from its exclusive sovereign jurisdiction over waters flowing within its territory."[735]

After that the plaintiff state would have proven the existence of substantial injuries on its side, the proof to establish that the utilisation of the shared waters was equitable and reasonable would rest on the shoulders of the state whose use of the waters is reported to be causing significant harm to others.[736] This rule applies in all the cases, except those

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[732] B. Lankford 'Does Article 6 (Factors Relevant to Equitable and Reasonable Utilization) in the UN Watercourses Convention misdirect riparian countries?' (2013) 2 (38) *Wat int'l* 130, 130.

[733] Available at *https://dictionary.cambridge.org/fr/dictionnaire/anglais/reasonable* , accessed on 20 June 2019.

[734] Lankford (note 733 above; 143); see also O. McIntyre (d) 'Utilization of shared international freshwater resources–the meaning and role of "equity" in international water law' (2013) 38 (2) *Wat Int'l* 112, 116.

[735] Artcile 7 of the ILC's 1994 *Draft Articles of the 1997 UNWCC.*

[736] D. Freestone & S.Salman 'Ocean and Freshwater Resources' in D. Bodansky *et al.* (eds) The Oxford Handbook of International Environmental Law (2007), 351.

where the reported injury results from some extra-hazardous sources.[737] Nevertheless, the guidance that is found in most of the law texts and cases, plus the prescriptions of some international customs in the field of transboundary water resources enable a better apprehension of the fairness and reasonableness of the use of international rivers.

4.3.2.4 Application of the equitable and reasonable utilisation principle by international and regional jurisdictions

The principle of equitable and reasonable utilisation is formulated with terms that are flexible and non-definite. Because of such flexibility, the application of this principle in the resolution of actual water conflicts has strongly depended on the analysis of the particularities of each disputed watercourse by the appointed judges. The notorious *Gabčíkovo-Nagymaros* case[738] between the Republic of Hungary and Czechoslovakia (now Slovakia), offers one of the most authoritative illustrations in this regard.

The *Gabčíkovo-Nagymaros* case was triggered by the *Gabčíkovo-Nagymaros* project on the Danube River.[739] On September 16, 1977, these two countries signed a treaty, which instituted an integrated joint project for hydroelectric power generation, flood control, and navigation.[740] The project further included an investment program. Each country was supposed to carry out the project in its territory and at its expense. The conflict began when, on May 13, 1989, Hungary unilaterally suspended the project operations on its portion of the Danube River, causing Czechoslovakia to replicate with the unilateral implementation of its 'Variant C' of the project.[741] The 'Variant C' of the project was one of the alternatives the country has for the development of the concerned section of the Danube River.[742]

The implementation of the 'variant C' of the project by Czechoslovakia caused a significant decrease in the overall flow of the Danube River downstream, thus

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[737] ILC *The 1994 Draft Articles of the 1997 UNWCC* (1994), 104.

[738] UN *Summaries of Judgments, Advisory Opinions and Orders of the International Court of Justice 1997-2002* (2003), 1-15.

[739] *Ibid*.

[740] *Ibid*.

[741] *Ibid*.

[742] *Ibid*.

harming Hungary. In front of such a challenge, Hungary became obliged to consider the project as "environmentally unsound", and therefore take an appropriate action, which for the country was the unilateral termination of the 1977 Treaty.[743] On its side, the Czechoslovakian government claimed the project to be environmentally sound, showing themselves willing to resolve any environmental issue, which may have arisen, under the frame of the 1977 Treaty, which Hungary unilaterally terminated.

The matter was brought to the ICJ. The ICJ considered the case and released its decision four years later, on September 25, 1997. The Court held that both Czechoslovakia/Slovakia and Hungary were authors of wrongful acts, and therefore in breach of their international obligations. The ICJ's judgment was pronounced took into account the International law of transboundary watercourses, and particularly Article 5(2) of the 1997 UNWCC, which erects into obligation the duty for riparian states to equitably and reasonably utilise a transboundary watercourse. This is among other things, what substantially the ICJ held:

> "Re-establishment of the joint regime will also reflect in an optimal way the concept of common utilisation of shared water resources for the achievement of the several objectives mentioned in the Treaty, in concordance with Article 5, paragraph 2, of the Convention on the Law of the Non-Navigational Uses of International Watercourses".[744]

Besides the pronouncement relating to the equitable and reasonable utilisation principle, the judgment rendered by the ICJ on the *Gabčíkovo-Nagymaros case* has also clarified several other issues in the field of transboundary watercourses, including the obligation that lays on riparian states not to cause harms to each other, and the obligation to cooperate.[745]

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[743] *Ibid*.

[744] *Ibid*. at 8.

[745] *Ibid.*

4.3.3 The "no significant harm" principle

4.3.3.1 Statement of the principle

The principle of "No significant harm" is one of the widely recognised principles in the field of environmental law.[746] It is particularly crucial in the field of international water law. Some scholars see in the "No significant harm" principle an emanation of the doctrine of limited territorial sovereignty.[747] According to the *no significant harm* principle, no state within an international river basin is allowed to use the section of the transboundary watercourse in its jurisdiction in a way that could cause any *significant harm* to any other co-riparian state.

Harms to a co-riparian state may concern the state's environment, safety, population's health, whether human, animal or vegetal.[748] Article 7 of the 1997 UNWCC provides:

> "1.Watercourse States shall, in utilising an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States. 2. Where significant harm nevertheless is caused to another watercourse State, the States whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of articles 5 and 6, in consultation with the affected State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation." [749]

The no significant harm principle was already present in the 1911 Madrid Declaration and the 1966 Helsinki Rules.[750] It is also present in current Multilateral

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[746] Sands (note 307 above; 236); See J. Gjørtz Howden 'Aspects of Sovereignty and the Evolving Regimes of Transboundary Water Management' (2015), 44-45.

[747] Mcintyre (note 619 above; 65).

[748] *Ibid.*

[749] Article 7 of the 1997 UNWCC.

[750] Articles V, X, XI, XXIX [2] of the 1966 Helsinki Rules make references to the no-harm principle. See Salman (d) (note 348 above; 58); there exists an early record of a significant state practice in a communication dated 1856 between the Dutch government and belgium, which addressed the diversion by Belgium of the River Meuse. This states' communication upheld that 'both parties are entitled to make the natural use of the stream, but at the same time, following general principles of law, each is bound to abstain from any action which might cause damage to the other'. See for more details McCaffrey (a) (note 145 above; 139).

Environmental Agreements (MEA) and Declarations, such as in Article 3 of the 1992 CBD, in principles 21 and 22 of the 1972 Stockholm Declaration, and in principles 2, 4, 13, and 24 of the 1992 Rio Declaration.[751] Furthermore, this principle has received steady support from the international tribunals in almost all the cases pronounced so far. McCaffrey[752] claimed that there is to date no known decision from any international court that supports any contrary rule to the no-harm principle.

Despite such a broad recognition, there are some unresolved fundamental questions with respect to the *no significant harm principle*. These fundamental questions are attached to the "significant" and the "harm" qualifiers of the principle. The first is "what is the scope of the qualifier 'significant'"; and the second refers to the threshold from which a "harmful" occurrence becomes "significant". In order to be *significant* states have argued that the level of the harm will need to be high, but not merely perceptible,[753] because if a harm is merely perceptible, it will be considered insignificant if a disagreement arises between states.[754] For Rieu-Clarke,[755] an occurrence must be more than carrying a mere "adverse effect" to qualify as "harm". It has to be a real impairment for the use or otherwise has some detrimental consequences on the environment or the socio-economic dimensions of the harmed state. The example here includes public health harms, damages on properties, industries, or agriculture. In all these cases, the significant character of harm has to be established by some pieces of evidence that are objective, which pieces of evidence would be determined on an individual basis.[756]

Concerning harmful occurrences under the 1997 UNWCC, some of them may be tolerated in certain circumstances, provided they do not cross the threshold of

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[751] *Ibid*. McCaffrey.

[752] *Ibid*. at 145.

[753] See debates in: ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 94.

[754] See, for example, Art 1 of the 2000 SADC Revised Protocol on Shared Watercourses.

[755] Rieu-Clarke *et al.* (note 277 above; 120).

[756] ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 94; Wouters *et al.* (note 719 above; 56); Sands (note 307 above; 242-246).

becoming "significant".[757] Notwithstanding the other provisions of the 1997 UNWCC, a riparian state is not to be held responsible for causing harm to another (in the event of a state complaint), provided it proves that it has taken all appropriate measures to avoid such harm to happen.[758] With such twists and concessions accompanying the no-harm claim, the possibility for a demanding state to legally establish that a defending state has caused it significant harm becomes very limited.

4.3.3.2 Application of the principle in the jurisprudence

The *Lake Lanoux* arbitration case referred to has maintained that 'there is a rule prohibiting the upper riparian state from altering the waters of a river in the circumstances calculated to do serious injury to the lower riparian state'.[759] Apart from the *Lake Lanoux* case, two more examples can be advanced of topical applications at the regional level. The first is from the Declaration of Asunción of June 1971 in Southern America, whereas the second is in the treaty on boundary waters between the US and Canada. Paragraph 2 of the Declaration of Asunción of June 1971, signed between Argentina and Brazil provided:

> "in successive international rivers, where there is no dual sovereignty, each state may use the waters in accordance with its needs provided that it causes no appreciable harm to any other state of the La Plata Basin."[760]

Under this provision, it transpires that both Argentina and Brazil have accepted a regime with some form of limited territorial sovereignty, due to the obligation *not to cause appreciable harm to the other*. The second example is drawn from the Boundary Waters Treaty between the US and Canada, signed in 1909, and that referred to many water law principles, including the no-harm principle. The US-Canada Boundary Waters Treaty

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[757] See article 7 (1) of the 1997 UNWCC: "Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States."

[758] Rieu-Clarke *et al.* (note 277 above; 121).

[759] See section 3.5.5 above.

[760] The Assumption Declaration is available at *http://www.fao.org/3/w9549e/w9549e03.htm;* accessed on 14 August 2019.

provides none of the two countries could make water a diversion or obstruction that is likely to injure the other state without the latter's prior consent.[761]

Similar to the 1971 Asunción Declaration, the 1909 USA and Canada boundary waters treaty has limited the territorial sovereignty of both signatories after signing the mutual obligation *not to cause any injury* to the each other without prior consent'.[762]

4.3.4 The principle of cooperation

4.3.4.1 Statement of the principle

The 1997 UNWCC establishes a general *Principle of Cooperation* in transboundary watercourses setups. Article 8 of the Convention stipulates:

> "1.Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit, and good faith in order to attain optimal utilisation and adequate protection of an international watercourse. 2. In determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions."[763]

The principle of cooperation is one of the most fundamental for the international law of transboundary watercourses. Due to its broad scope, the principle intertwines with almost all the other principles of this field.[764]

According to the United Nations, water cooperation refers to "the peaceful management and use of freshwater resources at local, national, regional and international levels among various players and sectors."[765] Biswas claimed that water cooperation would

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[761] See Article 2 of the Treaty between the United States and Great Britain relating to boundary waters, and questions arising between the united states and canada of 1909; McCaffrey (a) (note 145 above; 144).

[762] On the 1909 USA and Canada boundary waters treaty, see note 612 above.

[763] Article 8 of the 1997 UNWCC.

[764] M.M. de Franqa Doria *The Principle of Co-operation in the Law of International Watercourses* (unpublished PhD thesis University of London, 2008), 90.

[765] UN Water *Water cooperation in action: approaches, tools and processes* (2103), 1.

be the principal challenge of the 21st Century, because of the impacts of climate change on water resources and the necessity for adaptation and sustainable management of transboundary watercourses.[766] In this view, the 1997 UNWCC obliges states to consider taking into account "sovereign equality, territorial integrity, mutual benefit, and good faith" every time they would engage in water cooperation, in order to achieve optimal utilisation and adequate protection of their shared watercourses."[767]

4.3.4.2 Joint management institutions

Biswas'[768] above claim concerning water cooperation is also justified by the necessity to harmonise and sometimes coordinate states' effort in the field of climate change adaptation, for a sustainable management of shared watercourses. In general, water cooperation requires the establishment of joint management institutions, whose mandate includes the regulation of all the uses of the transboundary watercourses of the region covered by the institution.[769] Under Article 8(2) of the 1997 UNWCC, however, there seems to be no explicit legal obligation to establish such joint management institutions whether at watercourse or at river basin levels.

Article 8(2) above provides "In determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions…".[770] The treaty uses the word "may", which means that it does not intend any binding rule behind the provision. States have therefore the latitude to appreciate the necessity or not to establish joint management institutions at river basin or watercourse levels.[771]

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[766] Biswas (note 171 above; 5).

[767] Article 8 of the 1997 UNWCC.

[768] See section 4.3.4.1 above; Biswas (note 171 above; 5).

[769] Fitzmaurice & Elias (note 680 above; 14).

[770] Article 8 (2) of the 1997 UNWCC.

[771] The binding character of a treaty provision depends on the vocabulary which is used in that particular provision; the verbal forms 'shall' and 'should' used in provisions imply different levels of bindingness. On vocabulary used by treaties to define bindingness or unbindingness, see D. Bodansky 'Legally Binding versus Non-Legally Binding Instruments' in S. Barrett *et al Towards a Workable and Effective Climate Regime* (2015) 155 at 155. Available at *http://voxeu.org/sites/default/files/file/bodansky.pdf* , accessed on 22 October 2019).

However, the unbinding character of Article 8(2) does not mean that the 1997 UNWCC has not granted proper attention to joint mechanisms for water management. The overall spirit of the 1997 UNWCC remains its openness and flexibility in order to give enough space to riparian states to decide which system works better in their particular contexts. Although it actually obliges state consultations in certain circumstances, Article 8, which is in line with Article 24, may as well be seen as recommending states to 'enter into consultations' with each other to consider the establishment of joint mechanisms or commissions, as they would think necessary, concerning the management of their international watercourses. In that regard, the sixth ILC Special Rapporteur observed:

> "The management of international watercourse systems through joint institutions is not only an increasingly common phenomenon but also a form of cooperation between watercourse States that is almost indispensable if anything approaching optimum utilisation and protection of the system of waters is to be attained."[772]

Effective implementation of the 1997 UNWCC will mostly rest upon the establishment of some degree of joint institutional arrangements for better coordination of the management of a shared watercourse, whether bilateral or multilateral ar watercourse or river basin levels.[773]

4.3.4.3 Discussing the necessity of water cooperation at the transboundary level

There is at the transboundary level a global consensus on the necessity for riparian states to cooperate around their shared waters. A recent deliberation of the UN Security Council during an open debate on water, peace, and security recalled the same.[774] The then UN Secretary-General, Mr Ban Ki-moon, stressed the determining character that cooperation around water resources would play towards the future of peace and security at the global

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[772] See the ILC's *Sixth Report on the Law of the Non-navigational Uses of International Watercourses* (1990), (A/CN.4/SER.A/1990/Add.l (Part 1) 7; Rieu-Clarke *et al.* (note 277 above; 192).

[773] McCaffrey (d) (note 388 above; 85); J. Gupta (d) (note 489 above; 127-128); P. Wouters 'International law–facilitating transboundary water cooperation' (2013) *Background Papers* no 17, 14; Sanchez & Roberts (note 9 above; 234).

[774] Proceeding of the UN Security Council 7818th meeting of November 22, 2016, available at *https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/spv_7818.pdf* ; accessed on 20 March 2019.

level. What motivated Mr Ban Ki-moon was the scope of the looming climate change-related water crisis:

> "By 2050, at least one in four human beings will live in a country where the lack of freshwater is chronic or recurrent. Climate change will only aggravate these difficulties, especially in basins shared by several countries. It is particularly important to coordinate water management for the more than 260 international watercourses and transboundary aquifers, which are at least as numerous… Water challenges affect us all. Let us use this Security Council meeting to highlight the value of water as a reason for cooperation, not conflict. And let us commit to investing in water security as a means to ensure long-term international peace and security."[775]

Somewhat in the same direction as the Secretary-General, Bokova[776] claimed that cooperation over water resources at a local, national, and regional scales was the only possible way forward if humanity ever expects to overcome the many challenges surrounding water resources in the climate change era that the world has entered in. With the rise of climate change pressure on water resources, the interconnections that already exist between water resources and politics tend to become more complex.[777] While the water-climate nexus poses a global safety problem as explained above,[778] abundant literature has confirmed that states' propensity to cooperate is stronger than their propensity to conflict over shared water resources.[779]

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[775] *Ibid*.

[776] Speech or Bokova reported in M. Bennett 'Transboundary Water Management—Some Success Stories' In *Natural Resource Conflicts: From Blood Diamonds to Rainforest Destruction* Vol 2 (2016), 96.

[777] *Ibid*.

[778] See section 2.2.6 above.

[779] Strategic Foresight Group *water cooperation quotient 2017* (2017), 1-5 available at *https://www.strategicforesight.com/publication_pdf/Water%20Cooperation%20Quotient%202017.pdf*. This report notices that out of 231 transboundary River basins that were analysed, there was 182 that developed a minimum of water cooperation, 49 that had no water cooperation , and 91 that had active water cooperation; A.T. Wolf Shared 'waters: Conflict and cooperation' (2007) 32 *An Rev of Env & Res* 241, 241-244; S. Schmeier *Governing International Watercourses - River Basin Organizations and the sustainable governance of internationally shared rivers and lakes* (2012), 20.

4.3.4.4 Application of the principle in judicial decisions

Two "historical cases" can be referred to as examples of the application of the principle of cooperation in judicial decisions by international tribunals. These cases comprise the *Lake Lanoux* arbitration case between France and Spain, and the *Gabčíkovo-Nagymaros* case between Hungary and Czechoslovakia/Slovakia. Both cases were discussed earlier.[780] In the *Lake Lanoux* case, the court called upon both countries to effectively cooperate around the shared Lake, in order to better respect and take into account the interests and rights of the downstream riparian states in the projects of upstream states on a shared watercourse.[781] Likewise, in the *Gabčíkovo-Nagymaros case*, the ICJ's decision reads the re-establishment of joint regimes as an optimal way of common utilisation of shared watercourses.[782]

Both the *Lake Lanoux* arbitration case and the *Gabčíkovo-Nagymaros* settlement illustrate the application of the cooperation principle through judicial decision, as both cases have acknowledged the necessity to cooperate around transboundary watercourses because of the existence of a "community of interest" attached to this particular type of context.[783]

4.3.5 The other principles of international water law

The other relevant principles to be briefly outlined in this thesis are the principle of *regular exchange of data and information*, the principle of *notification concerning planned measures with possible adverse effects*, and the principle of *peaceful settlement of disputes.* These less impactful principles, sometimes even controversial, were proposed to a greater extent by either the ILA or the IIL.[784] They are now all codified under the 1997 UNWCC, and therefore form part of the international conceptual framework to govern transboundary watercourses and issues relating to them.

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[780] See section 3.5.5 above on the Lanoux Lake case; See section 4.3.2.4 for the *Gabčíkovo-Nagymaros* case.

[781] See section 3.5.5 above.

[782] *Ibid*.

[783] Rieu-Clarke *et al.* (note 277 above; 123).

[784] See section 3.5.4 above.

4.3.5.1 Principles of regular exchange of data and information

Articles 9 of the 1997 UNWCC introduces the principle of regular exchange of data and information that riparian states may detain concerning a transboundary watercourse.[785] Yet, the principle was already applied by treaties before the 1997 UNWCC, but often in a non-binding form, whether in water treaties or in declarations of principles. Article 9 (1) of the 1997 UNWCC provides:

> "1.Pursuant to article 8, watercourse States shall on a regular basis exchange readily available data and information on the condition of the watercourse, in particular, that of a hydrological, meteorological, hydrogeological and ecological nature and related to the water quality as well as related forecasts."[786]

Under this provision, the exchange of the "readily available data and information" on the "condition" of a shared watercourse constitutes an international obligation for riparian states.

Articles VI to VIII of the 1960 Indus Waters Treaty, for instance, or Articles 2 to 5 of the 1995 SADC protocol on shared watercourse systems, or even the 1992 UNECE Watercourses Convention, in its Articles 6, 9, 11, 12, 13, 15, and 16, have all made reference to the principle of exchange of data and information.[787] The Declarations that have considered the principle include the 1972 Stockholm Declaration on Human Environment (principles 13, 22, and 24),[788] the 1992 Rio Declaration on Environment and Development (principles 7, 9, 12, 13, 17 and 27),[789] and the1966 Helsinki Rules (Articles XXIX and XXXI).

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[785] Articles 5 (2), 8, 9, 11, 12, 24.1, 25.1, 27, 28(3), and 30 of the 1997 UNWCC refered to these principles.

[786] Artcile 9 (1) of the 1997 UNWCC.

[787] The 1960 Indus Waters Treaty is available at *https://treaties.un.org/doc/Publication/UNTs/Volume%20419/volume-419-I-6032-English*.pdf , accessed on 11 September 2019. The 1995 SADC protocol on shared watercourse systems available at *http://www.samsa.org.za/Documents/SADC_Protocol_on_Shared_Watercourses.pdf* , accessed on 11 September 2019; the 1992 UNECE Watercourses Convention available at *https://www.unece.org/fileadmin/DAM/env/water/pdf/watercon.pdf* , accessed on 11 September 2019.

[788] See Principles 13, 22, and 24 of The 1972 Stockholm Declaration on Human Environment.

[789] The 1992 Rio Declaration on Environment and Development is available at *https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf* .

Considering the fact that issues regarding water resources are increasingly politicised, the fear around this principle of exchange of data and information is that states may not completely comply with this obligation.[790] This is because information or data on water resources that are regarded as strategic by a state may not be easily shared with the other riparian states, as most of the States consider several types of information to be strategic.[791] Such strategic information and data are sometimes related to shared water resources, in which case, the 1997 UNWCC do not put any obligation on any state to share such information. .of the 1997 UNWCC provides:

> "Nothing in the present Convention obliges a watercourse State to provide data or information vital to its national defence or security. Nevertheless, that State shall cooperate in good faith with the other watercourse States with a view to providing as much information as possible under the circumstances."[792]

This principle of regular exchange of data and information and that of water cooperation are intertwined because States would smoothly exchange water data and information within a pre-establish water cooperation framework, than without, as per Article 8 of the 1997 UNWCC discussed earlier.[793]

4.3.5.2 Principles of notification concerning planned measures with possible adverse effects

Beyond the obligation to regularly exchange data and information, riparian States are obliged to notify each other concerning any planned measure on the shared watercourse. A state would further cooperate with the other riparian states for any development on a shared watercourse that may have adverse effects.[794] Adverse effects that are mentioned here are

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[790] See the final report of the Australian 'NSW strategic water information and monitoring plan' available at *https://www.industry.nsw.gov.au/__data/assets/pdf_file/0005/153806/NSW-strategic-water-information-and-monitoring-plan-final-report.pdf* , accessed on 12 July 2019.

[791] W. Yu 'Benefit sharing in international rivers: findings from the Senegal River Basin, the Columbia River Basin, and the Lesotho highlands water project." *Working Paper* 1 (2008).

[792] Article 31 of the 1997 UNWCC.

[793] McCaffrey (d) (note 388 above; 86).

[794] UNGAS Sixth Committee (51st Session) 'Summary Record of the 12th Meeting of the Working Group on the Law of the Non-Navigational Uses of International Watercourses' (7 October 1996) UN Doc

either present or future effects of such a development.[795] Articles 11 and 12 of the 1997 UNWCC provide:

> "11. Watercourse States shall exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse. 12. Before a watercourse State implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures."[796]

The logical consequence of the provision above is that every riparian state of a transboundary watercourse is entitled to prior notice and consultation in case of any project "which is likely to have a substantial adverse effect on the shared watercourse". In this circumstance, being notified becomes a right for a riparian state, especially if the proposed project is likely to cause to it an adverse effect . On the basis of the precautionary principle, such an obligation exists even if the context gives the impression that there not any possibility of significant harm, as per Article 6 of the 1997 UNWCC.[797] Yet there is a significant degree of unpredictability associated with the determination of what effect qualifies as adverse and what does not, in order to implement Articles 11 and 12 above.

Although generally accepted by states and endorsed in several bilateral and multilateral instruments and declarations, the prior notification principle is opposed by

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A/C.6/51/SR.12 at 4-12; Committee on the Uses of the Waters of International Rivers, ILA, Chapter 4 of the Helsinki Rules on the Uses of the Waters of International Rivers' (1966).

[795] Birnie & Boyle (note 386 above; 322).

[796] Articles 11 and 12 of the 1997 UNWCC.

[797] The Precautionary principle is a key principle in International Environmental Law. It begun to appear in international legal instruments in the 1980s. The Core of the Precautionary principle is reflected in principle 15 of the Rio Declaration on Environment and Development mentioned earlier (see note 776 above). It proclaims: "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

some riparian states.[798] From the very beginning of the process of negotiation of the 1997 UNWCC, it is reported that the principles under Articles 11 to 18 of the 1997 UNWCC were opposed by some riparian states that are positionally upstream.[799] During the adoption of the 1997 UNWCC, Ethiopia, Rwanda, with twenty-four other states would abstain from voting, whereas Turkey and two other states would vote against the 1997 UNWCC.[800] Nevertheless, the ILA clarified the controversial character of the principles by a statement the organisation made, which it referred to as the "Complementary Rules Applicable to International Water Resources", adopted in Seoul, South Korea, in 1986. In this statement, the ILA explained:

> "When a basin State proposes to undertake or to permit the undertaking of a project that may substantially affect the interests of any co-basin State, it shall give such State or States notice of the project. The notice shall include information, data, and specifications adequate for assessment of the effects of the project."[801]

It is believed that the opposing States mentioned above were most reluctant to the principles of law under Articles 11 to 18 of the 1997 UNWCC because of their content, which they did not correctly understand at least, at a first stage.[802] That is why the ILA had to issue a declarative clarification aimed at helping these states better understand the content and the *modus operandi* of these principles in order to improve states cooperation and adherence to these principles. Despite these efforts, the observation is that Ethiopia, Rwanda, and Turkey were not part of the 1997 UNWCC at the time of the entry into force.[803]

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[798] The opposing states include Ethiopia and Rwanda for the Nile River basin, and Turkey for the Tigris–Euphrates River basin. See details in Birnie & Boyle (note 386 above; 319).

[799] *Ibid*. Birnie & Boyle.

[800] *Ibid*.; See section 4.4. below. See annexe1 below of the list of states at the adoption of the 1997 UNWCC.

[801] S. Bogdanovic International Law of Water Resources: Contribution of the ILA (1954-2000)' (2001), 364.

[802] *Ibid*. at 365.

[803] List of countries party to the 1997 UNWCC available at *https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-12&chapter=27&lang=en* , accessed on 10 June 2019.

4.3.5.3 Principles of peaceful settlement of disputes

This section could not finish without discussing the issue of water conflicts, to which the regime of the 1997 UNWCC gives an important place. The peaceful settlement of water-related disputes calls all riparian states of transboundary watercourses to settle issues on shared watercourses by peaceful means, in the hypothesis of states failing to reach an agreement by negotiation. From a transboundary water law perspective, "dispute" can involve a range of situations, stretching from minor disagreements to serious controversies.[804] Dispute implies "a disagreement on a point of law, a fact, a conflict of legal views or of interests between at least two persons."[805] It requires at least two opposing sides, which have to "'hold clearly opposite views concerning the question of the performance or non-performance of certain' international obligations."[806] The existence of a dispute is determined whether by particular facts, or by any statements or documents that may be exchanged between the parties, or by any exchanges made in multilateral settings, or at last by the conduct of the parties.[807]

The lengthy Article 33 of the 1997 UNWCC provides for peaceful settlements of disputes over transboundary watercourses. Paragraph 1 of Article 33 of the 1997 UNWCC provides:

> "In the event of a dispute between two or more parties concerning the interpretation or application of the present Convention, the parties concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means in accordance with the following provisions."[808]

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[804] S.C. McCaffrey (k) 'Water disputes defined: characteristics and trends for resolving them' in *Resolution of International Water Disputes* (2003), 49–51.

[805] Mavrommatis Palestine Concessions *Objection to the Jurisdiction of the Court, (Germany v. United Kingdome)* (1924) P.C.I.J. (ser. A) No. 2, 6.

[806] See *Alleged Violations of Sovereign Rights and Maritime Spaces in the Caribbean Sea* (Nicaragua *v.* Colombia.), I.C.J. Preliminary Objections (2016), 27; See *Interpretation of Peace Treaties with Bulgaria, Hungary and Romania*, I.C.J Advisory Opinion (1950), 74.

[807] See *Obligations concerning negotiations relating to cessation of the nuclear arms race and to nuclear disarmament* (Marsh. Is. v. U.K.), I.C.J Preliminary Objections (2016), 19–20.

[808] Article 33 (1) of the 1997 UNWCC.

Dispute resolution in matters pertaining to transboundary waters is different from dispute resolution in matters relating to water resources at national level. Mechanisms for dispute resolution in international settings reflect mechanisms of general international law.[809] In international law, state sovereignty remains the fundamental element in dispute settlement, as they have to remain in control of the process, even after consenting to the mechanisms to resolve a dispute. Globally accepted conflicts resolution mechanisms includes "legal mechanisms", and "Assisted Negotiations or Third party involvement". The legal mechanisms comprise arbitration and adjudication procedures.[810]

In arbitration procedures, the arbitrators and the procedure they apply are chosen by the parties that act in all confidentiality, whereas in adjudication procedures, the International Court of Justice (ICJ) appoints judges to the matter, whereas parties have no discretion over the composition of the court, nor any control over its rules of procedures. The ICJ is the principal judicial organ of the UN. It has its own rules of procedure, to which the parties are to abide.

The third party involvement mechanism implies that the conflicting states choose to make use of a neutral individual, a state, or an international organisation. Third party involvement can consist of a range of mechanism, including: the facilitation/good offices,[811] mediation, fact finding/inquiries, and conciliation. Good offices are attempts to influence the opposing parties to enter into negotiations. It facilitates the dialogue between them, making it possible to them to meet and discuss.[812] Good offices does so through, for instance, providing a venue for the discussions to take place. Good offices do not have any active role in terms of the content of the discussions. Its role habitually ends once the parties start negotiating.

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[809] See Articles 2(3) and 33 of the UN Charter

[810] *Ibid.*

[811] See generally Salman M.A. Salman, Good Offices and Mediation and International Water Disputes, in Resolution of International Water Disputes 155, 158.

[812] S.C. McCaffrey (k) 'Water disputes defined: characteristics and trends for resolving them' in *Resolution of International Water Disputes* (2003), 49–51.

Mediation mechanisms consist of a neutral third party between the conflicting parties, which has an active participation in the negotiation process.[813] The parties generally agree on a mediator whom they chose. The mediator is involved in communication between the parties, finding common grounds, clarifying issues, drafting proposals, etc. He is generally entitled to make suggestions to the conflicting parties to find and adopt a mutually acceptable solution to the conflict. A *fact finding mechanism* is conducted either by a panel of experts or by a single one.[814] The role of the experts is to investigate and make impartial findings on the disputed facts, and eventually suggest to the parties the terms of settlement of the conflict.

A conciliation mechanism is an impartial third party. It is often a formal, institutionalised and impartial commission.[815] Its mission is to investigate and objectively establish the facts of the conflict, and find the applicable law. A conciliation mechanism may also submit proposals to the parties as a solution to the conflict, or even as a way towards such a solution.[816]

The principle of peaceful settlement of disputes is incorporated in the majority of modern treaties on international waters and proclaimed in notorious declarations touching environmental matters including shared water resources. The 1992 CBD for instance, or the 1960 Indus Waters Treaty, the 1995 SADC protocol on shared watercourse systems, the 1995 Mekong Agreement, and the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes" of the United Nations Economic Commission for Europe,[817] to name but a few, have all made reference to the principle of peaceful settlement of water disputes.[818] Well-known declarations

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[813] *Ibid.*

[814] *Ibid.*

[815] *Ibid.*

[816] *Ibid.*

[817] The United Nations Economic Commission for Europe is hereinafter referred to as the "UNECE". The 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes is hereinafter referred to as the "1992 UNECE Watercourses Convention".

[818] See Article 27, Annexe II of the 1992 CBD; Article IX, Annexure F, G of the 1960 Indus Waters Treaty; Article 7 of the 1995 SADC protocol on shared watercourse systems; Articles 18.C, 24.F, 34, 35 of the 1995 Mekong Agreement; Article 22, IV of the 1992 UNECE Watercourses Convention.

include the 1966 Helsinki Rules, the 1992 Rio Declaration, and the 2004 Berlin Rules on Water Resources.[819]

There is an ongoing court case concerning the *Silala River* in southern America, which opposes Chile and Bolivia since June 6, 2016.[820] This case is expected to apply the 1997 UNWCC over the status and the use of the waters of the Silala River.[821] There is a great expectation that the conclusion of the *Silala River* case in the coming years, would enrich the list of judicial decisions rendered in transboundary matters which so far seems to be meagre in comparison to cases rendered in some other fields.[822]

4.3.6 The connection between the principles of transboundary water law

The principles of international law that govern the transboundary watercourses as discussed above are closely interrelated.[823] For McCaffrey,[824] such interrelations are inherent to the complex nature of the rights and obligations that are placed on riparian states because of the transboundary character of these water resources. The same author[825] noticed that compliance with one of these principles could have a significant influence on the compliance vis-à-vis the others, and vice versa. The case to be discussed is the connections between the "no significant harm" principle and the "equitable and reasonable utilisations" principle, which are both intertwined in various ways.[826] Article 7 of the 1997 UNWCC

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[819] Articles XXVI and XXXVII of the 1966 Helsinki Rules; Principle 26 of the 1992 Rio Declaration; Articles 72–73 of the 2004 Berlin Rules.

[820] *See* Unofficial Press Release, International Court of Justice: 'Chile Institutes Proceedings against Bolivia with Regard to a Dispute Concerning the Status and Use of the Waters of the Silala' No. 2016/16 (June 6, 2016), *http://www.icj-cij.org/docket/files/162/19018.pdf* , accessed on 7 October 2018; See Rossi (note 47 above; 56).

[821] With the Silala case pending before the International Court of Justice, there is great expectation that in the coming years, the list of judicial decisions rendered in transboundary waters issues will increase the contribution which so far is meager in this field.

[822] Rossi (note 47 above; 55).

[823] McCaffrey (d) (note 388 above; 83).

[824] *Ibid*.

[825] *Ibid*.

[826] *Ibid*.

obliges riparian states not to cause significant harm to each other, whereas Article 5 obliges them to equitably and reasonably utilise transboundary watercourses.

The ILC 1994 draft Articles of the 1997 UNWCC has clarified the relations that are between the "no significant harm" and the "equitable and reasonable utilisations" principles. The ILC's commentary concerning Article 7 of the 1997 UNWCC reads:

> "Where, despite the exercise of due diligence, significant harm is caused to another watercourse
> State, the State whose use causes the harm shall, in the absence of agreement to such use, consult with the State suffering such harm over:
>
> *(a)* The extent to which such use is equitable and reasonable taking into account the factors listed in article 6;
>
> *(b)* The question of ad hoc adjustments to its utilization, designed to eliminate or mitigate any such harm caused and, where appropriate, the question of compensation."[827]

The above precision from the 1994 Draft Articles shows that a State that has diligently complied with Article 5 of the 1997 UNWCC may nevertheless be accused of breaching the convention's Article 7. In such a case, even though the plaintiff State may prove the existence of harm, it must foremost check if the defendant state did not comply with its obligation under Article 5, to equitably and reasonably utilise the shared water resource. In the case of positive compliance with Article 5 by the defendant state, a charge of breaching a conventional obligation may not be retained against it, neither would such a State undergo any condemnation.[828]

The defending state, however, would not content itself with such an absence of liability. It would not merely walk away free of any corrective action; the defending State would need to take actions in the sense of mitigating or reducing or to the possible extent totally suppressing the harm that was unintentionally caused to the plaintiff State.[829] The conclusion here is twofold: *i.* The use of shared water resources by one riparian state can

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[827] ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 102.

[828] McCaffrey (d) (note 388 above; 91).

[829] *Ibid*.; See Article 7.2. of the 1997 UNWCC.

cause significant harm to another, even if such use is equitable and reasonable;[830] *ii.* there is no breach of the obligation under Article 7 of the 1997 UNWCC if a defendant state will prove its due diligence in observing Articles 5 and 6 of the 1997 UNWCC, provided the plaintiff's claim is based on harms stemming from water use by the defendant state.[831]

A further illustration of the intertwined character of the legal principles of international water law is provided by the pivotal role played by the obligation to cooperate under the 1997 UNWCC. The implementation of almost all the other principles of the convention depends on the existence of states cooperation.[832] The ILC emphasised this affirmation while recognising that it was not possible to imagine any other development concerning the convention happening without cooperation. In that regard, the ILC made the following comment concerning Article 8 of the 1997 UNWCC on 'General Obligation to Cooperate':

> "Article 8 lays down the general obligation of watercourse States to cooperate with each other in order to fulfil the obligations and attain the objectives set forth in the draft articles. Cooperation between watercourse States with regard to their utilisation of an international watercourse is an important basis for the attainment and maintenance of an equitable allocation of the uses and benefits of the watercourse and for the smooth functioning of the procedural rules contained in part three of the draft."[833]

Water cooperation relates to both the "no significant harm" and the "equitable and reasonable utilisation" principles in several ways. Various studies and treaties have repeatedly stressed the importance of state cooperation first if one seeks to achieve equitable and reasonable utilisation of transboundary watercourses.[834] Aso,

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[830] *Ibid.*

[831] *Ibid.*

[832] Rieu-Clarke *et al.* (note 277 above;123).

[833] See the provision Article 8(1) of the 1997 UNWCC. See ILC *the 1994 Draft Articles of the 1997 UNWCC* (1994), 106.

[834] See, for instance, Articles 24 and 30 of the Mekong River basin agreement, Articles 3 and 4 of the 2000 Revised SADC Protocol, and Articles 3 and 4 of the 2002 Framework Agreement of the Sava River basin. See also the 1944 USA-Mexico Water Treaty; 1964 Columbia Treaty between USA and Canada; and Articles

riparian States that have already developed working water cooperation will naturally refrain from causing any harm to each other, in comparison, for instance, to the riparian states that have not yet developed such a cooperation framework.

4.4 The United Nations Convention on the Non-navigational Uses of International Watercourses of May 21, 1997

The factors and information associated with the genesis of the 1997 UNWCC were discussed in section 3.3.6 above. This section focuses on the legal aspects thereof.

4.4.1 Adoption and legal form

The 1997 UN-Watercourses Convention is the instrument that has codified the global norms in the field of transboundary watercourses.[835] The convention was adopted on May 21, 1997, in New York, USA, and entered into force on August 17, 2014.[836] Its adoption was a global expression to see the development of an international legal framework to govern the use of the waters of the transboundary watercourses.[837] The 1997 UNWCC is a framework convention. It includes thirty-seven articles and four parts, plus an annexe that is dedicated to disputes Settlement. Most of the provisions of the Convention are drafted in binding terms, with the summons "states shall" being omnipresent.[838] The convention's style has remained general, vague, and balanced, leaving enough room for States practice and interpretation to contextualise its substantial and procedural obligations.

In the period that preceded the adoption of the 1997 UNWCC, states' expectation was that the convention would help improve the management of shared water resources. One common anticipation from downstream and upstream states was that the

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VI–VIII of the 1960 Indus Waters Treaty. There is also the preamble of the 1961 IDI Salzbug Resolution, and Article 5 of the Montreal Rules on Water Pollution in an International Drainage Basin.

[835] S.C. McCaffrey (c) *The Evolution of International Law relating to Transboundary waters* (2017), 205; E.B. Weiss The Evolution of International Law (2007) 331 *Recueil des c*, 165; McCaffrey (j) (note 289 above; 17).

[836] See note 790 above.

[837] C. Tagus 'La Convention sur le droit relatif à l'utilisation des cours d'eau internationaux à des fins autres que la navigation : Interprétations et Perceptions' (2014), 6 ; available at *http://www.ihei.fr/wp-content/uploads/2014/07/M%C3%A9moire-2014.pdf* , accessed on 27 July 2019.

[838] See for instance Articles 3,5,7,6(2), 8(1), 9, 10(2) of the 1997 UNWCC.

convention would take into consideration all the claims related to the complex process of sharing transboundary waters.[839] After the adoption of the convention, the expectations then turned towards seeing States ratifying the convention for its entry into force. Having considered all these series of state's expectations, McCaffrey[840] argued that the adoption of the 1997 UNWCC could be looked at as a victory. The convention affirms the sovereignty of each state on the waters that are present on its territory and provides a global framework in which all states could *a priori* find their account, whether upstream or downstream.[841]

4.4.2 The objective of the convention

The 1997 UNWCC does not have a provision expressly dedicated to its objective. However, its preamble states that

> "The Parties to the present Convention… Taking into account the problems affecting many international watercourses resulting from, among other things, increasing demands and pollution, Expressing the conviction that a framework convention will ensure the utilisation, development, conservation, management, and protection of international watercourses and the promotion of the optimal and sustainable utilisation thereof for present and future generations, Affirming the importance of international cooperation and good-neighbourliness in this field…"[842]

The objective of the Convention, therefore, is to ensure the utilisation, the development, the conservation, the management, and the protection of international watercourses, and also ensure the promotion of the optimal and sustainable utilisation thereof, for the present and future generations, having in mind the capital character of the international cooperation and good neighbourliness among countries.

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[839] Moellenkamp (note 674 above; 1420).

[840] McCaffrey (j) (note 289 above; 187).

[841] Article 8 (1) of the 1997 UNWCC.

[842] The Preamble of the 1997 UNWCC.

4.4.3 The convention's core principles

Five principles are generally regarded as the most substantial in the international regime of transboundary watercourses.[843] These principles include:

i. *The equitable and reasonable utilisation principle;*
ii. *The obligation not to cause significant harm;*
iii. *The obligation to cooperate;* and
iv. *The notification of other states regarding planned measures*;
v. Peaceful dispute settlement.

These principles are enshrined in Articles 5 to 10 of the 1997 UNWCC and were discussed in the previous section.[844]

4.4.4 The convention's slow ratification process and delayed entry into force

The 1997 UNWCC entered into force after almost seventeen years of opening to ratification, following the 35th state ratification, pursuant to Article 36 of the convention.[845] Besides, there were 23 years of negotiation that led to its adoption, bringing to 44 the number of the years needed for the emergence of the current international regime of transboundary watercourses. The Socialist Republic of Vietnam became the Convention's 35th ratifying state, after submitting its instrument of accession on May 19, 2014.[846] That is the reason why, on its comment on the 1997 UNWCC, Salman[847] observed that the Convention's entry into force was "only the climax of a very long, difficult and complex process".

However, the treaty's delayed entry into force received considerable attention from scholars, who generally set out to find the reasons behind such a

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[843] McCaffrey (a) (note 145 above; chapter 5).

[844] See section 4.3.5 above.

[845] Article 36 of the 1997 UNWCC provides: "1. The present Convention shall enter into force on the ninetieth day following the date of deposit of the thirty-fifth instrument of ratification, acceptance, approval or accession with the Secretary-General of the United Nations..."

[846] For details, see note 785 above.

[847] S. Salman 'Entry into force of the UN Watercourses Convention: why should it matter?' (2015) 1 (31) *Int J of Wat Res Dev* 4, 4.

phenomenon, especially after the broadly successful treaty adoption.[848] Table 3 below offers a comparative analysis of the timeframe between the adoption and entry into force of some environment-related treaties.

For the World Wildlife Foundation (WWF),[849] many states were experimenting the phenomenon of "*treaty congestion*" at the time of the adoption of the 1997 UNWCC; that is the reason why they could not give to it the necessary political attention. As argued by Anton,[850] treaty congestion is a phenomenon that is caused by the appearance of too much law, at a too fast speed. The WWF[851] further indicated that the lack of a specific institution such as a secretariat to the 1997 UNWCC, which would be tasked with advocating for the Convention's fast entry into force was an additional reason for its lethargy. For Bošnjaković,[852] the delay reflects the existence of tensions around the regime of the treaty. For this author, the delay further shows that states fundamental divergences that characterised the treaty's negotiations process were not fully resolved at the time of the adoption of the treaty. However, the reasons for the convention's delayed entry into force might as well be elsewhere, as will be discussed in the next section.

[848] See section 4.4.5 below.

[849] The World Wildlife Fund (WWF) is a NPO whose mission is to conserve nature and reduce the most pressing threats to the diversity of life on Earth. See for more details: *https://www.worldwildlife.org/about* , accessed on 15 May 2019.

[850] Anton, Don. *Treaty Congestion'in International Environmental Law* (2012), 2.

[851] The World Wildlife Fund (WWF) is a NPO whose mission is to conserve nature and reduce the most pressing threats to the diversity of life on Earth. See for more details: *https://www.worldwildlife.org/about* , accessed on 15 May 2019.

[852] Bošnjaković (note 418 above; 5).

Table 3: Time spent between the adoption and the entry into force of some MEA

Convention	Adoption	Sign	Parties	Entry into force	Entered After	Condition for entry into Force
Conv. on Bio. Div.[853]	5 June 1992	168	196	29 Dec. 1993	~1 year	90th day following the 30th instrument of ratification, acceptance, approval, or accession.
Conv on Desertif.[854]	17 June 1994	115	197	Dec. 1996	~2 years	90th day follow. the 50th …
UNFCCC[855]	4 June 1992	165	197	21 Mar. 1994	~2 years	90th day follow. the 50th …
Paris Agreem.[856]	28 Dec 2015	195	186	4 Nov. 2016	~1 year	30th day following the 55th …party representing 55 percent of global emissions
Ozone Conv[857]	22 Mar. 1985	28	197	22 Sept. 1988	~ 3 years	90th day follow. the 20th …
UN-Water Conv.[858]	May 1997	103	36	17 Aug. 2014	~17 years	90th day follow. the 35th …

Source: This thesis own comparison of information.

From the above table, it becomes evident that states poorly support the 1997 UNWCC, even from the time of its adoption. It also becomes palpable that states poor

[853] See the United Nations Convention on Biological Diversity at *https://www.cbd.int/doc/legal/cbd-en.pdf* , accessed on 12 July 2019.

[854] See the United Nations Convention to Combat Desertification at : *https://www.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf* , accessed on 12 July 2019.

[855] See the UNFCCC at *https://unfccc.int/resource/docs/convkp/conveng.pdf,* accessed on 12 July 2019.

[856] See the 2015 Paris Agreement at *https://unfccc.int/sites/default/files/english_paris_agreement.pdf* , accessed on 12 July 2019.

[857] See the Vienna Convention on the Protections of the Ozone layer at *http://mountainlex.alpconv.org/images/documents/international/convention_ozone_layer.pdf* , accessed on 12 July 2019.

[858] See the 1997 UNWCC *https://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf* , accessed on 12 July 2019.

support caused the lack of interest in treaty ratification, thus delaying the treaty's entry into force. Whereas 14 years were necessary to gather 35 ratifications for the entry into force of the 1997 UNWCC, it only took a few months to the 2015 Paris Agreement to realise the same performance. Also, from a figure of 103 signatures for treaty adoption to obtaining only 36 ratifications after 14 years, there must be some reasons behind that might need further investigation.

4.4.5 States' reluctance to ratify or join the convention

Some of the immediate questions that naturally come when one is analysing the regime of transboundary watercourses are "why the states that voted for the adoption of the 1997 UNWCC have been after that generally reluctant to its ratification?"[859] a further question may also be "Did any significant change occur either to the convention or to some states after the adoption of the 1997 UNWCC, and which caused states to distance themselves from the convention?"[860] Whatever the answers to these two questions, the decrease of States' support to the 1997 UNWCC as observed so far does not reflect what was States' aspiration during the negotiation phase of this treaty. Scholars have expressed different views in that regard.[861]

Stoa,[862] for instance, thought that states might have changed their positions vis-à-vis the 1997 UNWCC right after its adoption, whereas Salman[863] went far and advanced six reasons, which he thinks were the explanation of States' drawback from the 1997 UNWCC. Salman's first reason relates to the relationship between the equitable and reasonable use principle (Article 5) and the no significant harm principle (Article 7). As mentioned earlier, downstream riparians states tend to favour the no-harm principle

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[859] M.A.S. Salman 'The United Nations Watercourses Convention ten years later: Why has its entry into force proven difficult?' (2007) 1 (2) *Water Int'l* 1, 8.

[860] The stage of states signature, which precedes states ratification, authenticates the text of a Convention in its adoption phase. The fact that a State signs a treaty is significantly reflective of its will to cooperate or adhere to its regime. See generally the Vienna Convention on the Law of Treaties of May 23, 1969, available at *https://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf* , accessed on 12 July 2019.

[861] R.B. Stoa 'The United Nations watercourses convention on the dawn of entry into force' (2014) 47 *Vand. J. Transnat'l L.* 1321, 1334.

[862] *Ibid*.

[863] Salman (note 860 above; 8).

because it protects the actual uses of shared waters against the new ones, and protects the downstream states from significant impacts that may result from upstream States' projects.

Conversely, upstream riparian states have a tendency to view the 1997 UNWCC as biased and mostly in favour of the downstream riparians.[864] Upstream States' conviction is based on the prescription of Article 6 of the 1997 UNWCC, which poses an obligation to a riparian State not to cause significant harm to the others. In this regard, Salman[865] noticed that States that opposed the 1997 UNWCC and those that abstained from voting for it were mainly upstream states vis-à-vis the waterbodies they belong.[866] Seeing that it is generally the downstream states that are plaintiffs, the upstream States felt in Article 6 above a lack of equilibrium that favoured the downstream States. In general, upstream states lean towards favouring the equitable and reasonable utilisation principle because it gives them more latitude to utilise the shared watercourse, even for activities that may have non-significant impacts downstream.

On the other hand, downstream states also complained about the 1997 UNWCC.[867] Their fears were based on the same provisions of Articles 5 and 7. They claimed that the convention was in favour of the upstream riparians.[868] Downstream states argued that the regime created by the 1997 UNWCC was subordinating the no significant harm principle to the equitable and reasonable use principle, thus favouring the upstream states.[869] They further claimed that under the 1997 UNWCC's regime, upstream states could be free from any international responsibility if they could prove to have observed due diligence and complied with Articles 5 and 6 of the Convention, even if there may exist allegations from downstream states of harmful conducts. For Salman, [870] although this issue

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[864] *Ibid*.

[865] *Ibid*.

[866] The three countries that opposed the Convention are Burundi, China and Turkey. They are all upstream states, whereas some of the states that abstained from its vote were also largely upstreams. This is the case for countries such as Bolivia, Mali, Ethiopia, and Tanzania.

[867] Salman (note 860 above; 8).

[868] *Ibid*.; Downstream states such as Egypt, France, Pakistan or Peru abstained from voting for the convention. See annexe 1 below on the category of votes by states during the adoption of the 1997 UNWCC.

[869] Salman (note 860 above; 8).

[870] *Ibid*. at 9.

was debated and solved under the working group tasked at negotiating the convention, it seems as if the plaintiff states lost the conviction that the compromise that they accepted during the negotiations would work for their interests.

These two positions, however, are not representative of the opinions of the majority of States, whether upstream or downstream. States, whether upstream or downstream, voted for the convention in a way or another after a definite consideration of the content and the implication of these two provisions. The main issue here relates to state inaccuracy in the perception and interpretation of Articles 5 and 7 of the 1997 UNWCC.[871] A significant number of countries that voted in favour of the adoption of the 1997 UNWCC are downstream states. Countries such as the Netherlands, Portugal, and South Africa are in this category. This implies that the perception by some downstream countries that the Convention was biased and in favour of upstream countries is inaccurate and a mere misrepresentation of the truth.[872] However, such a misrepresentation that has significantly contributed to states' reluctance from the 1997 UNWCC.[873]

The second factor advanced by Salman relates to the perception by upstream riparian states that the notification process established by Articles 12-19 of the 1997 UNWCC was in favour of downstream riparian states because it provides them with a sort of "veto power" over upstream projects.[874] This conception is also erroneous because it is based on the idea that the harm that is regulated under Article 7 can only travel downstream but not upstream. The reality is that downstream states as well can harm the upstream ones. For example, a poor upstream state can be harmed by a potential foreclosure from future uses of the shared watercourse.[875] The Renaissance Dam in Ethiopia is a typical case of an upstream state being harmed by a downstream state by way of a potential foreclosure of any future development on a shared watercourse. [876] In other words, an upstream state can be prohibited from developing its share of water in a transboundary watercourse tomorrow,

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[871] *Ibid*. at 11.

[872] *Ibid*.

[873] *Ibid*.

[874] *Ibid*.

[875] *Ibid*.

[876] *Ibid*. ; See for further details on the Renaissance Dam: Nasr (note 311 above); Cascão (note 311 above).

if a more prosperous downstream state has already implemented earlier some developments on the shared watercourse.

The third factor that has led to states' reluctance from ratifying the 1997 UNWCC is how its regime has dealt with the existing transboundary water agreements.[877] Some riparian states that already had water agreements in place think that the 1997 UNWCC has failed to give full recognition to those existing treaties.[878] The unhappy states have built such a conviction on the fact that the 1997 UNWCC suggests that the country parties may consider harmonising their existing agreements in the sense of aligning them with the Convention's principles. On the other side, riparian states that were left out by the existing treaties were not happy, too, because they believed that the 1997 UNWCC should have subjected all the previous water treaties to its provisions by requiring from treaties a consistency with the overall regime it has established.[879] However, this reason, as the two previous ones, find their roots in the lack of accurate understanding of the provisions of the 1997 UNWCC.

Thinking on Salman's third factor, the 1997 UNWCC does not affect any existing rights or obligations stemming from bi- or multilateral treaties on shared watercourses signed before its adoption and entry into force.[880] Water agreements that are in force remain so, depending on the will of its signing States. Nonetheless, the 1997 UNWCC does ask the signing parties to consider, if they deem it necessary, to harmonise such existing treaties with the principles that are proclaimed in the Convention. Such an approach is reflexive of the flexibility of the 1997 UNWCC, which goes to the extent of allowing watercourse states to sign

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[877] *Ibid*.; Salman (note 860 above; 11).

[878] *Ibid*.; See preamble, and Arcticles 3 and 8, and the subsequent provisions of the 1997 UNWCC.

[879] *Ibid*.

[880] See Article 3 of the 1997 UNWCC provides: "1. In the absence of an agreement to the contrary, nothing in the present Convention shall affect the rights or obligations of a watercourse State arising from agreements in force for it on the date on which it became a party to the present Convention. 2. Notwithstanding the provisions of paragraph 1, parties to agreements referred to in paragraph 1 may, where necessary, consider harmonizing such agreements with the basic principles of the present Convention." The convention uses the word "May", which imply a non-binding declaration.

agreements that contextualise its provisions and make their individual water treaties fit the specific characteristics of their international watercourses.[881]

The fourth reason relates to the dispute settlement mechanism under the 1997 UNWCC.[882] Whereas some riparian states view in this mechanism a too weak dispute settlement tool because of its lack of any binding character, others see in it a compulsory mechanism.[883] These State's concern revolves around the finding procedure established under the 1997 UNWCC, which for them, interferes with the general principle of a state's sovereignty to choose its dispute settlement procedure.[884] Being a framework convention, the 1997 UNWCC does provide for a primary mechanism for determining the facts of the dispute, and after that, leaves the process to the parties to agree or disagree on suitable conflict resolution methods. The only obligation which the convention establishes, in this case, is that parties are to submit their dispute to an impartial fact-finding process for the sake of dispute resolution rather than putting undue burden over states.[885]

The Fifth factor that has caused states reluctance vis-a-vis the 1997 UNWCC's regime is the apprehension by some States that by joining the convention, they would lose part of their sovereignty over the transboundary watercourse; the inclusive definition of "international watercourse" under the 1997 UNWCC has also reinforced this perception.[886] A few states already criticised the 1994 draft convention for its failure to expressly refer to the state's sovereignty over the part of a transboundary watercourse located in its territory. For Salman,[887] states that develop such a perception indicate a failure to grasp the basics of the contemporary international law of shared water resources. To raise higher

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[881] See Article 3 of the 1997 UNWCC.

[882] Article 33 of the 1997 UNWCC.

[883] Beaumont (note 661 above; 486).

[884] *Ibid*. Beaumont; For the debate on article 33, see the summary records of the relevant meetings of the Sixth Committee at the fifty-first session of the General Assembly (1996, resumed in 1997): A/C.6/51/SR.21, paras. 1–50; A/C.6/51/SR.23, paras. 85–90; and A/C.6/51/SR.59, paras.1–35.

[885] *Ibid*. Beaumont.

[886] Salman (note 860 above; 12); Green Cross Int'l & World Water Commission *National Sovereignty and International Watercourses* (2000), 18. See the definition of "international watercourse" under Article 2 (b) of the 1997 UNWCC.

[887] Salman (note 860 above; 12).

or praise states sovereignty beyond what the 1997 UNWCC already did would have equated to giving a new credit either to the absolute territorial sovereignty doctrine or perhaps to the absolute territorial integrity one, depending on how downstream and upstream states would have understood such a provision.

The idea of a global treaty on transboundary watercourse was indeed the vow of all states.[888] Nevertheless, the application of such a treaty is what perhaps posed a problem. As claims Guzman[889] "all states agree that cooperation is necessary, but they after that disagree on how this cooperation would take place". A majority of States agreed on the principle of having a global instrument that would regulate riparian states' relationships and in the meantime, regulate their relationships with their shared watercourse. However, it appears as if, at the end of the negotiation process, a majority of them could not be satisfied with the outcome.

Even before considering the relatively small number of states' signatures to adopt the 1997 UNWCC, there exist some other significant factors, which are further indications of the malaise around the 1997 UNWCC; a malaise that should have been addressed. Thirty-one States did not attend the 1997 UNWCC adopting session, whereas 27 that were present abstained from voting, and 3 voted against the convention. Such a significant stand away move was from the beginning a sign that something essential already stalled, which the negotiation process perhaps was unable to notice or address.

A negative vote constitutes an act of rejection of any convention, whereas an abstention may mean in certain circumstances a rejection of a convention's regime.[890] The physical absence of a state's delegates from the voting session can be diversely interpreted, but in the end, it generally suggests a lack of interest to the matter which is being voted.[891] However, it must be stressed that not all states have an interest in the topic of the non navigational uses of transboundary water resources. This is the case for island states, for instance. It is therefore understandable that a category such as the island states

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[888] C. Pahl-Wostl *et al.* 'Governance and the global water system: a theoretical exploration' (2008) 14 *Gl Gov* 419, 421-422.

[889] See T. Guzman *How international works. A rational choice theory* (2010), 155.

[890] Salman (note 860 above; 4).

[891] *Ibid.*

would not show a great interest to the voting process of the 1997 UNWCC, to the extent of not being present for its adoption.

For Rieu-Clarke, [892] however, there is a great need to improve the issue of the legal regime of transboundary watercourses; and "if nothing is done in that view, it is likely that states will not be able to cooperate over shared watercourses, and will instead manage their shared watercourses in a fragmented way". Fragmented approaches to the management of transboundary water resources are no longer recommended because they are considered ineffective to address the contemporary issues surrounding transboundary water resources, including the impacts of climate change.[893]

Before closing this section, it is appropriate to briefly outline the "Convention on the Protection and Use of Transboundary Watercourses and International Lakes" of the United Nations Economic Commission for Europe of 1992, because its regime will be evoked in chapter 7 below through the cases study of the Danube and Rhine watercourses.

4.5 The Convention on the Protection and Use of Transboundary Watercourses and International Lakes of March 17, 1992

The 1992 UNECE Watercourses Convention was adopted at Helsinki, on March 17, 1992. It entered into force four years later, in 1996.[894] The Convention was prepared with the assistance of the UNECE, whose secretariat arranged a draft for nearly two years.[895] The Convention aims at ensuring sustainability in the use of transboundary water resources by facilitating states' cooperation.[896] The 1992 UNECE Watercourses Convention was initially conceived to address the needs of the UNECE countries. The UNECE region is characterised by abundant rainfalls and dense hydrographic networks of domestic and

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[892] Rieu-clarke *et al.* (note 277 above; 9).

[893] *Ibid.*

[894] See note 704 above on the UNECE. The UNECE Watercourses Convention is available at : *https://www.unece.org/fileadmin/DAM/env/water/pdf/watercon.pdf*

[895] A. Tanzi *The Economic Commission for Europe Water Convention and the United Nations Watercourses Convention: An Analysis of their Harmonized Contribution to International Water Law* (2015), 3.

[896] *Ibid*. Tanzi; See also the Convention's preamble , since the convention do not have any provision dedicated to its objective.

transboundary watercourses.[897] The environmental degradation and water pollution that became a major concern in the early 1990s within the UNECE space reflected on the UNECE 1992 Watercourse Convention, whose regime focuses on the protection of the environment and the waters of the region.[898]

In 2003, the 1992 UNECE Watercourses Convention was amended to allow accession to any UN member state, which accessibility would become effective from March 2016.[899] This opening meant that two UN multilateral agreements would cover the same subject matter, thus bringing in the field of international water law an unprecedented situation, regarding the operationality of such a potentially dualistic regime.[900] Some authors have evoked the possibility of applying the *lex posterior derogat priori* rule, according to which a new treaty derogates an old one.[901] In that sense, they have claimed that the 1997 UNWCC would be derogatory to the 1992 UNECE Watercourses Convention. However, it has been demonstrated that, in the event of provisions compatibility between these two conventions, the *lex posterior derogat priori* rule would not be operative, being that the two treaties are rather complementary to each other.[902]

The relationship between these two complementary treaties is what the ILC qualifies as "a relationship of interpretation".[903] A case of "relationship of interpretation" arises when "a norm in either of two treaties is able to assist in interpreting a norm within

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[897] *Ibid*. Tanzi.

[898] *Ibid*.

[899] *Ibid*.

[900] *Ibid*.

[901] *Ibid.;* The maxim *lex specialis derogat legi generali* is a principle of treaty interpretation, as a supplement of Artcile 32 of the 1969 Vienna Convention on the Law of Treaties. It is a technique of interpretation of treaties, which is generally accepted. It also serves in conflict resolution in treaties in international law. It has for instance been applied in the *Beagle Channel Arbitration case.* See *Beagle Channel Arbitration case (Argentina v. Chile)* ILR vol. 52 (1979), 141. See for further details: *https://www.oxfordreference.com/view/10.1093/acref/9780195369380.001.0001/acref-9780195369380-e-1282*, accessed on 12 October 2019.

[902] For treaties comparison, see generally A. Tanzi *The Relationship between the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the 1997 UN Convention on the Law of the Non Navigational Uses of International Watercourses* (2000).

[903] ILC *Report on the 58th Session* (2006) (A/61/10, paragraph 251. 2), 407.

the other treaty, in the sense of its application, clarification, modification, or even its updating. In the case of a *relationship of interpretation*, both norms are "applied in conjunction".[904] Therefore, a relationship of interpretation is what better defines the relationship between the regimes under the 1997 UNWCC and the UNECE 1992 Water Convention.[905] In other words, the systemic integration of both rules is possible.

Tanzi,[906] who earlier studied these matters, noticed certain characteristics on both treaties that make them complementary. For this author, even though both treaties had the same operational objective on subjects such as the establishment of a cooperative spirit and the establishment of joint institutions and structures, their approaches to issues regarding the non-navigational uses of the transboundary watercourses were quite different. Matters such as the adoption of joint bodies and related arrangements are treated differently in both instruments.[907] Furthermore, Tanzi[908] noticed that the 1997 UNWCC inclined more on the "economic and equity" dimensions of the non-navigational uses of international watercourses, whereas the 1992 UNECE Watercourses Convention rather leaned on environmental protection issues.

A further area of complementarity of the two treaties comes from the fact that they do not all approach some specific subjects with the same level of detail. Regarding the principle of the *equitable and reasonable use of shared waters*, for instance, even if the two treaties have adopted it, the 1997 UNWCC seems to have displayed more details regarding its content and implementation, in comparison to the 1992 UNECE Watercourses Convention. On the other hand, the 1992 UNECE Watercourses Convention appears more comprehensive than the 1997 UNWCC concerning the protection of aquatic ecosystems and the prevention of water pollution.[909]

Based on the above explanations, there seem to be no legal grounds for seeing as inappropriate the co-existence of both UN convention in the field of transboundary

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[904] *Ibid*.

[905] *Ibid*.

[906] Tanzi (note 896 above; 27). In this reference, the author raises some differences between the two treaties.

[907] *Ibid*.

[908] *Ibid*.

[909] On the differences between the two treaties, consult generally Tanzi (note 896 above; 27-31).

watercourses. A the time of the drafting of this thesis, seventeen states were parties to both treaties, whereas twenty-seven states were a party only to the 1992 UNECE Watercourses Convention, against nineteen states that were a party only to the 1997 UNWCC.[910]

4.6 Conclusion

This chapter has introduced and discoursed on the conceptual and legal frameworks that govern the transboundary watercourses at the international level. The focus of this thesis being the laws that govern transboundary the Congo River and its transboundary tributaries, it was crucial to first discuss and understand the fundamental features of the international law of transboundary watercourses, to ensure a base for the thesis future thinkings. Furthermore, any recommendation to be formulated by this thesis at a later stage regarding the integration of the climate change dimension in the legal regime that governs the waters of the Congo River and its transboundary tributaries will need to be based on the international laws and principles applicable to transboundary watercourses. The United Nations codified only recently the international law of the non-navigational uses of transboundary watercourses through the adoption of the 1997 UNWCC. Before that, there was a legal vacuum in this field, which caused a general uncertainty concerning States' rights and duties towards a transboundary watercourse. During that time, some doctrines were emitted including the absolute territorial sovereignty, the absolute territorial integrity, the limited territorial sovereignty, and the community of interest, aimed at helping states solve their claims and counterclaims in transboundary water matters. The advent of the 1997 UNWCC has codified some early principles in this field including the equitable and reasonable utilisation, the no-significant harm, the principle of cooperation, the regular exchange of data and information on shared watercourses, the prior consultation of other riparian, and the principle of peaceful resolution of water conflict along shared watercourses. Apart from analysing some substantial features of the 1997 UNWCC, this chapter has also briefly introduced the 1992 UNECE Watercourses Convention, opened to accession to all member states of the UN since 2016, and being found substantially complementary to the 1997 UNWCC.

The next part of this thesis will introduce the hydrography of the Congo River and its tributaries and describe the legal regime that governs its water resources.

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[910] See Annexe 3 below.

PART III

THE HYDROGRAPHICAL DESCRIPTION OF THE CONGO RIVER AND ITS TRANSBOUNDARY TRIBUTARIES AND THE LEGAL FRAMEWORK THEREOF.

5 HYDROGRAPHIC DESCRIPTION OF THE CONGO RIVER AND ITS TRANSBOUNDARY TRIBUTARIES

5.1 Introduction

This chapter sets out to provide a hydrographic description of the Congo River and its transboundary tributaries. The objective of this chapter is to describe the main features of the Congo watercourse, in order to enhance the understanding of its particularities. After reviewing in the previous chapter the theoretical and legal basis of the international law of transboundary watercourses, a description of the hydrography of the river system under study was crucial before any analysis of the legal framework of such a unique transboundary water system. As postulates McCaffrey,[911] "knowledge of the general characteristics of Earth's water system is necessary for an understanding of the effect of legal rules governing the use of freshwater." Therefore, a few analyses will be undertaken at the end of this chapter, after that all the necessary hydrographic descriptions have been made. The analysis will cover selected issues related to the impacts of climate change on the Congo River and its transboundary tributaries. Although the description of the Congo water system is the primary focus of the chapter, this will not help much unless the water resources which are described are viewed from a slightly broader perspective. As suggest Lamb,[912] the study of a geographical area should always be approached as inherently transdisciplinary, with due consideration to a range of other transversal factors. This chapter comprises six sections, contents of which are designed to cover its objective. The first section broadly presents the Congo River basin. The second presents the Congo River and its tributaries. The third focuses on the direct and indirect impacts of climate change on the waters of the Congo River. The fifth section discusses a way forward for the Congo watercourse, before closing with a conclusion.

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[911] McCaffrey (a) (note 145 above; 23).

[912] V. Lamb *et al.* 'Introduction: Resources Politics and Knowing the Salween River' in C. Middleton & V. Lamb (eds) *Knowing the Salween River: Resource Politics of a Contested Transboundary River* (2019), 4.

5.2 The Congo River basin

5.2.1 Presentation

The Congo River basin is located in the Central African region.[913] According to the definition of a river basin discussed earlier,[914] the Congo River basin can be understood as the land area from which all surface run-offs that form the Congo watercourse flow from, before discharging themselves into the Atlantic Ocean. The Congo River basin extends from latitude 09^0 15' N in the Central African Republic to latitude 13^0 28' S in the Republics of Angola and Zambia, and from longitude 31^0 10' E at the great African Lakes to longitude 11^0 18' E at the Atlantic Ocean.[915] Map 1 below illustrates the geographical extent of the basin.

Map 1: The Congo River basin: physical delineation and position in Africa

Source: *https://de.wikipedia.org/wiki/Luapula, accessed on 24 July 2019.*

[913] See Map 1.

[914] See section 2.3.2 above.

[915] Mccracken & Wolf (note 23 above; 12, 47); I.J. Harrison *et al.* 'The Congo River Basin' *The Wetland Book: II: Distribution, Description and Conservation* (2016) 1, 2.

The Congo River basin includes at least ten countries which are Angola, Burundi, Cameroon, the Republic of the Congo, the Central African Republic, the DR-Congo, Gabon, Rwanda, Tanzania, and Zambia.[916] Sources are divergent regarding the number of states that form the Congo River hydrographic basin, and researchers are inclined to include a more significant number of states, among which Uganda, South-Sudan, and Malawi, depending on the aim of a study.[917]

The river basin occupies a surface of approximately 3.8 million square kilometres, which covers almost the entire territorial surface of the DR-Congo, much of the surface of the Republic of the Congo, a vast portion of the CAR, and some portions of Angola and Cameroon.[918] Table 4 below gives an idea of the surface areas of the countries that form the Congo River basin and displays the countries' shares in the total area of the basin.

[916] On the number of the riparian states of the Congo basin, see FAO 'The Congo/Zaire River basin' available at *http://www.fao.org/3/W4347E/w4347e0n.htm* , accessed on 14 July 2019; see also Global Forest Atlas ' the Congo Basin Forest' available at *https://globalforestatlas.yale.edu/region/congo* accessed on 14 July 2019; See also A.T. Wolf *et al.* 'International river basins of the world' (2010) 4 (15) *Int'l J of Wat Res Dev* 387, 393 and 396.

[917] CICOS *Schéma Directeur d'Aménagement et de Gestion des Eaux de la CICOS* (2015), 7, available at *https://library.wmo.int/doc_num.php?explnum_id=4884* , accessed on 16 May 2019 ; UNEP (a) (note 12 above; 212); H. Cooley *et al.* 'Understanding and reducing the risks of climate change for transboundary waters' (2009), 96.

[918] *Ibid*. CICOS at 13.

Table 4: Elements of the geographical profile of the States of the Congo Basin

Country	Total Area of Country (km^2)	Total Area of Country within the CR-Basin (km^2)	Share of the country in the total area of the Basin (%)[919]	The total area of the country within the Basin (%)
Angola	1,246,700	285,395	7,69	22,90
Burundi	27,834	14,574	0,48	52,40
Cameroon	475,440	96,395	2,70	20,30
Congo	342,000	246,977	6,90	72,20
CAR	622,980	403,570	10,80	64,80
Gabon	267,667	1,146	0,03	-
RD-Congo	2,344,860	2,313,350	62,10	98,70
Rwanda	26,340	6,464	0,10	24,50
Tanzania	945,090	244,593	4,50	25,90
Zambia	752,610	177,735	4,70	23,60
Total/Mean	7,051,521	3,790,199	100.00	

Source: CICOS[920]

The population that lives across the basin is estimated to be around 93.2 million inhabitants.[921] For most of the riparian countries of the Congo watercourse, the current average annual rate of population growth, which is around 3 percent will double in the next 25 years.[922] Such an augmentation in the basin's population size will doubtlessly have repercussions on the basin's shared water resources because an increased number of people will mean higher water demand and further pressures on water resources.[923]

5.2.2 The legal status

The 1885 General Act of Berlin is the statutory document that gave a legal existence to the Congo River basin. Article 1 of the Berlin Act begins with providing a legal definition and delineation to the Congo River Basin. The provisions of Article 1 of the Berlin Act reads as follow:

[919] *Ibid.*

[920] *Ibid.* at 13.

[920] *Ibid.*

[921] *Ibid.*

[922] *Ibid.*

[923] *Ibid.*

> "1. … This basin is bounded by the watersheds (or mountain ridges) of the adjacent basins, namely, in particular, those of the Niari, the Ogowé, the Shari, and the Nile, on the north; by the eastern watershed line of the affluents of Lake Tanganyika on the east; and by the watersheds of the basins of the Zambesi and the Logé on the south. It, therefore, comprises all the regions watered by the Congo and its affluents, including Lake Tanganyika, with its eastern tributaries. 2. In the maritime zone extending along the Atlantic Ocean from the parallel situated in 2Âo30' of south latitude to the mouth of the Logé. The northern boundary will follow the parallel situated in 2Âo30' from the coast to the point where it meets the geographical basin of the Congo, avoiding the basin of the Ogowé, to which the provisions of the present Act do not apply. The southern boundary will follow the course of the Logé to its source and thence pass eastwards till it joins the geographical basin of the Congo. 3. In the zone stretching eastwards from the Congo Basin, as above defined, to the Indian Ocean from 5 degrees of north latitude to the mouth of the Zambesi in the south, from which point the line of demarcation will ascend the Zambesi to 5 miles above its confluence with the Shiré, and then follow the watershed between the affluents of Lake Nyassa and those of the Zambesi, till at last, it reaches the watershed between the waters of the Zambesi and the Congo." [924]

5.2.3 Population and demography

The Congo River basin is the biggest river basin in Africa, and the second in the world after the Amazon basin (6,915,000 square kilometres).[925] About one hundred million people lived in the Congo Basin in 2015.[926] The people are diversely dispersed across the Congo River basin, with three-quarters of the population of the basin living in the DR-Congo. The coincidence is somewhat ordinary because the DR-Congo represents 62 percent of the surface of the basin. The most populated areas of the basin are along the border between the DR-Congo, Burundi and Rwanda on the eastern edge of the basin, and also in the sector between Kinshasa and Mbuji-Mayi in the western edge of the basin.[927] Rwanda has the

[924] See Article 1 of the 1885 Berlin General Act, available at *http://21548675.weebly.com/berlin-conference-general-act-1885.html* , accessed on 10 April 2019.

[925] CICOS (note 918 above; 19).

[926] *Ibid*.

[927] *Ibid*.; Kinshasa is the capital city of the DR-Congo. Mbuji Mayi is one of major cities of the DR-Congo.

highest density on the basin, with about 400 people per square kilometre, and is followed with Burundi, which has around 300 people per square kilometre. The basin's lowest density is found in areas that have between eight to eleven people per square kilometre.[928]

The Republic of Angola, the CAR, and the Republic of the Congo contribute each with about seven to ten percent of the population of the basin. whereas nearly seven million Tanzanians are in the Congo River basin. In general, the population in the basin is very young, with more than 42 percent of the population being under 14 years. The majority (59 percent of the population) live in rural areas. If the current demographic trend continues, prediction says that the basin's population will double before the year 2035,[929] which will result in a worsening of the pressure that is currently put on the natural resources of the region, including waters. Scholars strongly advise that the exploding demographics of the region should be taken into consideration while planning over shared water resources.[930]

5.2.4 Climate

The climate of the basin is hot and humid and characterised with abundant rainfalls on a large part of its surface.[931] A closer focus on the microclimate of the basin reveals a wide variety of climates of smaller scope across smaller landscapes.[932] The cases of the microclimates created by the influences of the Atlantic ocean westwards and the Indian ocean eastwards contribute to the diversification of the climate within the basin. The influences of the equatorial zone and those of the mountains at the eastern edge of the basin participates as well in the determination of some more localised climates across the basin. Also, the uneven extension of the basin on either side of the Equator line (5° N and 13° S latitude) constitutes a further contribution to the diversification of the climate of the basin.[933] Around the Equator line, the temperatures hardly fall below 20 degree Celsius but do change considerably north-eastwards and south-eastwards, because of the abundant

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[928] CICOS (note 918 above; 24).

[929] *Ibid*.

[930] *Ibid*.

[931] A. Haensler (note 35 above; 4-5).

[932] *Ibid*.

[933] *Ibid*.

plateaus and of mountains, and the high altitudes. The temperature of the basin gravitates to an average of around 25 degrees Celsius.[934]

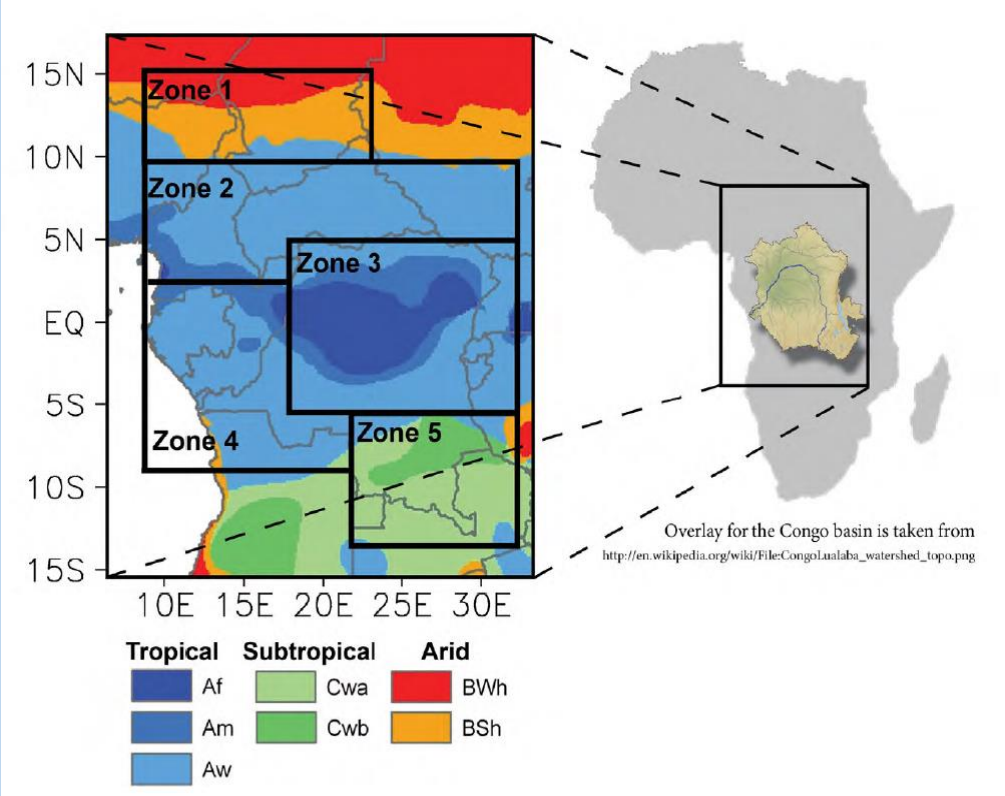
The distribution of seasons is unequal throughout the Congo River basin; neither do seasons last equally. There are in general two seasons, one is the *dry season,* and the other is the *rainy season*. The rainy season lasts from April to the end of June (the long rainy season), and from September to the end of October (the short rainy season) in the northern part of the basin. The dry season, in turn, lasts from early November to the end of March (long dry season) and from early July to the end of August (short dry season).[935] In the southern part of the Congo basin, under the Equator line, the rhythm of seasons referred to hereabove is reversed, thus providing to the basin a regular climate throughout its territory. The regularity of the climate across the basin reflects in the region's regular water supply, which comes from sources northwards and southwards from both sides of the Equator line.[936] Map 3 below gives an overview of the climatic zones of the Congo River basin. The bluer the colour is the wetter the climate becomes.

[934] *Ibid.*

[935] In the eastwards mountainous regions of the basin, two dry seasons last only one month, in January and in July. In the south and south-east of Katanga, the rainy season starts in mid-October and gets pro-runs until mid-May. In North Katanga and the South Kasai, the rains begin in early October to stop at the end of April, but a short dry season in the month of January. See for further details on the climate of the Congo River basin; See CICOS (note 918 above; 24).

[936] *Ibid.*

Map 2: An overview of the climatic zones of the Congo River basin



Source: Haensler (note 902 above; 41)

5.2.5 Hydrology and precipitation

The Congo River basin carries about 32 percent of Africa's freshwater resources.[937] Its main channel is the Congo River, which will be discussed in section 5.3 below. The northern and southern regions of Africa respectively receive 9 and 12 percent of the continent's rainfall, the Congo basin receives over 35 percent of its precipitations.[938] Precipitations in the basin are 1,100 mm to 1,700 mm per year on average, with some peaks of 2,000 mm observed in the DR-Congo specifically.[939] Some parts of the Republic of

[937] UNEP (a) (note 35 above; 41); UNWater/Africa *The Africa Water Vision for 2025: Equitable and Sustainable Use of Water for Socioeconomic Development* (2004), 10, report available at *https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/african%20water%20vision%202025%20to%20be%20sent%20to%20wwf5.pdf* , accessed on 19 April 2019.

[938] *Ibid*. UNEP; *Ibid*. UNWater/Africa.

[939] UNEP (a) (note 35 above; 42).

Congo and the DR-Congo receive an average of more than 2,000 mm of rains per year and include several flood-prone areas.[940]

The part of the Congo River basin that is situated in Tanzania has its lowest average annual rainfall estimated to approximately 1,100 mm per year, whereas the part of the basin that is within the DR-Congo has the basin's highest average annual rainfall, estimated to almost 1,700 mm per year, suggesting more vulnerability for floods as it will be explained further.[941] Extensive area and abundant rainfall patterns make the DR-Congo receive about two-thirds of all the rains of the basin, while the country contributes with roughly the same proportion to the total amount of the waters that flow through the Congo River basin.

5.2.6 Rainforest and biodiversity

Apart from its special endowment in water resources, the Congo River basin is equipped with a dense tropical forest cover and exceptional biodiversity, which are interrelated to water resources.[942] The Congo River basin is home to a significant portion of the world's biodiversity.[943] The flora at the lowland areas of the basin has more than 10,000 species of plants, of which 3,000 are endemic.[944] Forests naturally play the role of GHG sinks, thus contributing to the reduction of the atmospheric stocks of GHG.[945]

Forests also play a significant role in the hydrological cycle of a river basin. Monitoring the waters of a basin should, therefore, be extended to monitoring its forest cover.[946] The forest cover of the Congo River basin spreads over an area of nearly 160

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[940] Beyene (note 38 above; 4).

[941] J.B. Chishugi & B. F. Alemaw 'The hydrology of the Congo River Basin: A GIS-based hydrological water balance model' in *World Environmental and Water Resources Congress 2009: Great Rivers* (2009) 1, 14; UNEP (a) (note 35 above; 41).

[942] As discussed earlier, living things are made of water, and need adequate water supply for survival.

[943] B.Tchatchou *et al. Changement climatique dans le Bassin du Congo: Informations et connaissances échangées entre les acteurs* Vol. 185 (2015), 1.

[944] Harrison *et al.* (note 916 above ; 8).

[945] Tchatchou *et al.* (note 944 above; 1)

[946] On relations between waters and forest, read D. Hallema *et al*. 'Burned forests impact water supplies' (2018) 1 (9) *Nat com* 1307; D.G. Neary *et al.* 'Linkages between forest soils and water quality and quantity' (2009) 10 (258) *For Eco & Mngmnt* 2269, 2281; A.R. Hibbert *Forest treatment effects on water yield* (1965).

million hectares. The conservation and enhancement of the basin's environmental wealth are critical in contributing to the global effort to tackle climate change.

However, the basin's dense tropical forest and abundant water resources are increasingly threatened by aggravating deforestation. In the period between 2000 and 2005 for instance, the average of the basin's annual rate of deforestation was already approaching 0.17 percent.[947] Increasing deforestation and forest degradation are feared because they will have repercussions on the availability of water resources across the basin. There is a pressing need to halt deforestation and forest degradation across the basin and replaced them with forest conservation and enhancement, in order to avoid further impacts on the basin's hydrology.

Several forest concessions for industrial and commercial logging have been conceded by some of the countries of the basin to quite a few third operators in the timber industry. The concern is that these operators are often left with little state supervision, and nearly no adequate mechanism in place for reforestation, or sustainable forest management.[948] There are increasing numbers of international organisations that are giving to the forest cover of the Congo River basin considerable attention for water and biodiversity conservation, with the view of reaching adequate basin's contribution to climate change response.[949]

If forests, in general, contribute to the sequestration of the atmospheric GHG, [950] as mentioned above, the Congo River basin constitutes a special case. [951] In 2017, a recent study on the peatlands of the "inner delta" or "cuvette centrale" of the Congo River has discovered that the Congo basin's peatlands are home to some of the world's biggest

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[947] Tchatchou (note 944 above; 2); C. de Wasseige *et al. Les forêts du Bassin du Congo – État des forêts 2010* (2012), 276.

[948] C. Megevand *Dynamique de deforestation dans le basin du Congo (translation : Dynamics of deforestation in the Congo Basin)* (2013), 57, available at : *https://openknowledge.worldbank.org/bitstream/handle/10986/12477/9780821398272.pdf* , accessed on 22 May 2019.

[949] Harrison *et al.* (note 916 above; 2-3).

[950] A. Medinilla 'Understanding the International Congo-Ubangui-Sangha Commission' Background paper (March 2017), 6.

[951] *Ibid.*

underground carbon storages.[952] These peatlands that measure approximately four percent of the Congo basin area have stored nearly 30 billion tonnes of carbon. This amount of stored carbon is the equivalent of almost 30 percent of the world's reserve of tropical peatland carbon, and 20 years of the US emissions from fossil fuel.[953] The conservation of these peatlands and the search for the sustainability of the hydro-forestry complex of the Congo River basin are increasingly regarded as matters of global concern.[954]

5.3 The Congo Watercourse

5.3.1 Historical background

The Portuguese explorer Diego Cão discovered the mouth of the Congo River in 1482. After his discovery, he erected a pillar of stone on the shore of the river to mark his discovery.[955] Because of the presence of a pillar of stone on its shore, the Congo River was referred to by the passer-byes in those early epochs as the "Rio de Pedrão", meaning the "River Pillar".[956] However, the Portuguese named it "Congo" after the name of the ancient Kongo kingdom, which existed upstream. The indigenous people of the Kongo kingdom themselves referred to the same river as the "Nzadi", or dialectally "Nzai", meaning "the river", in one of the local dialects. In the sixteenth century, the word "Nzadi" would be translated by the Portuguese into "Zaire", which is the name that the late president Mobutu[957] would choose for the DR-Congo and its River, from the year 1971 to 1997.[958]

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[952] *Ibid*.

[953] *Ibid*.

[954] *Ibid*.

[955] E.J. Devroey & G.V. Campenhout *Le Bassin hydrographique congolais spécialement celui du bief maritime* (1941), 53; *available at http://www.kaowarsom.be/fr/node/6144* , accessed on 12 June 2019. Read this same volume for details on the History of the Congo River and its hydrology.

[956] The lower part of the Congo River was called "Barbila" in a distant time, whereas its upper part was called the "Lualaba" (or Lwalaba); see for details: *Ibid*. Devroey & Campenhout.

[957] Mr. Mobutu was a former president of the Demcratic Republic of the Congo, who stayed in power from 1965 to 1997. He was born in 1930 and dyed in 1997, few months after his overthrow by the rebels troops of Laurent Desire Kabila. For more information on Mobutu, see *https://www.britannica.com/biography/Mobutu-Sese-Seko*, accessed on the 9 June 2019.

[958] On the History of the DR-Congo, read D. Nevins & J. Heale. *Democratic Republic of the Congo* (2018).

Henry Morton Stanley was the first European to have navigated the whole Congo River, from its source (the Lualaba River) to its mouth (at the Atlantic Ocean) in 1877.[959] Stanley's expedition along the Congo River dispelled a confusion that existed in that epoch concerning the source of the Nile River. In that epoch, the Lualaba River was thought to be the source of the Nile River. Thanks to his expedition along the Congo River, Stanley discovered that the Lualaba was not the source of the Nile River, but instead the source of the Congo River, thus proving the first widespread belief to be wrong.[960]

The navigable network formed by the Congo River and all its tributaries reach approximately 25,000 kilometres length.[961] Such a considerable network of waterways is what for centuries connected the heart of the African continent to the rest of the world, through the Atlantic Ocean. Even though there is a natural barrier of stones (the Livingstone Falls), which is situated at the lower section of the Congo River and, which prevents any access inside the continent from the sea, the Congo River remains the channel of communication by excellence throughout the DR-Congo and the entire Congo Basin.[962]

The importance of the network of waterways formed by the Congo watercourse was recognised early enough by the colonial powers involved in the race for colonies in Africa, referred to as the "Scramble for Africa".[963] For them, the Congo River was a natural highway, which made possible penetration into the heart of Africa. There were no better means of communication that could connect to the inner parts of the black continent, and both people and goods circulated across the basin via its extensive hydrographic network. That is why, after deciding the colonisation of the new continent, it became so pressing for the European colonial powers to clarify the rights and obligations associated with the use of the Congo River.

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[959] Devroey & Campenhout (note 956 above; 53).

[960] *Ibid*.

[961] The actual figure is between 13,000 and 25,000 depending on the navigation criteria used. See CICOS *Schéma Directeur d'Aménagement et de Gestion des eaux de la CICOS, etat des lieux* (2015), 40.

[962] *Ibid*. at 19.

[963] See the South African History Online 'the Scramble for Africa' *https://www.sahistory.org.za/article/grade-8-term-3-scramble-africa-late-19th-century* , accessd on 14 April 2019; H. Brunschwig 'The Scramble for Africa. Documents on the Berlin West African Conference and Related Subjects, 1884-1885' in RJ Gavin & JA Betley (Eds) *Outre-Mers. Revue d'histoire* (1974) 225 (61), 609-610.

Colonial powers eventually resolved to meet, discuss, and adopt a regime that could satisfy the ambitions and expectations of all, to penetrate and trade throughout the African continent via the Congo River and its tributaries. The meeting would be held in Berlin, Germany, from 1884 to 1885, under which, the decision would be taken concerning the internationalisation of the Congo River and its tributaries.[964] The Congo River, therefore, would become a free zone of navigation for any ship of any nation in the world. Such decision to internationalise the Congo River and its tributaries was one of the most substantial achievements of the European colonisers because it allowed all of them to pursue their colonial projects and trade within the Congo River basin and deeper throughout the continent.

5.3.2 Physical Description

The Congo River measures approximately 4,700 kilometres and is the second-longest river of Africa after the Nile, which is 6,650 kilometres long.[965] As per the definition of the watercourse concept under Article 2 (a) of the 1997 UNWCC,[966] the Congo watercourse refers to the water system that is formed by the Congo River (the final outlet of the Congo River basin) and its tributaries, whether rivers, lakes, or underground waters, both domestic and transboundary. The Congo River has a flow rate estimated to approximately 45,000 cubic metres per second and carries about 32 percent of Africa's freshwater resources.[967] It is ranked the continent's water richest river, and the world's second, after the Amazon, in Brazil, which is endowed with a flow rate of nearly 209.000 cubic meters per second.[968]

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[964] See section 6.2.1 below.

[965] A. Laraque et *al* 'Spatiotemporal variations in hydrological regimes within Central Africa during the 20th Century' (2001) 245 *Jof Hydr* 104, 105; The Congo River measures 4,700 kilometres long if the Chambeshi River, which is a Zambian tributary of the Congo River is taken into consideration; See H.E. Hurst *et al.* 'Nile River' available at *https://www.britannica.com/place/Nile-River*, accessed on 10 April 2019.

[966] See section 2.4.2 above.

[967] UNEP (a) (note 35 above; 39-41); Conley (note 35 above; 41).

[968] The flow rate of the Congo River can reach a maximum of 80,832 m^3 per second; *Ibid*. UNEP (b) at 41; Beyene *et al.* (note 38 above; 3); yet, the CICOS advances the figure of 42.000 m^3 per second during the period of flood against 38.000 m^3 per second during recessions. See for details: *https://www.riob.org/fr/file/264089/download?token=9PZi3uCW* , accessed on 26 April 2019.

Shelton[969] recently discovered that the Congo could be the deepest river in the world, as some of its sections measured more than 200 m deep.

The sources of the Congo River are in the mountains of the great African rifts eastwards the territory of the DR-Congo, whereas its mouth is in the Atlantic Ocean south-westerwards the DR-Congo.[970] From its sources south-eastwards to its mouth south-westwards, the Congo River runs exclusively within the territory of the DR-Congo. From its sources, the river first flows north-westwards, and afterwards turns south-westwards, before discharging into the Atlantic Ocean.[971] However, in a controversial fashion, some sources claim that the source of the Congo River could be the Chambeshi River, which is a smaller river originating from the north-eastern part of Zambia.[972]

On its way to the Atlantic Ocean, the Congo River receives significant streams of waters from several tributaries of different sizes. While some of these tributaries are domestic, others are transboundary. The domestic tributaries originate from within the territory of the DR-Congo, whereas the transboundary tributaries originate from some of

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[969] USGS & J. Shelton 'A Field Trip to the Congo, Hydroacoustic measurements' in *The river that swallows all rivers* (2013), *available at http://www.usgs.Gov/public lecture series/archive lectures.asp* , accessed on 10 April 2019.

[970] Worldatlas 'what is the source of the Congo River?' Available at *https://www.worldatlas.com/articles/what-is-the-source-of-the-congo-river.html*, accessed on 07 April 2019; See also G.F. Sautter & R. Pourtier 'the Congo River' *https://www.britannica.com/place/Congo-River*, accessed on 7 April 2019; J. Runge 'The Congo River, Central Africa' in A. Gupta (ed.) *Large Rivers: Geomorphology and Management* (2008) 293, 293.

[971] UNEP (a) (note 35 above; 41).

[972] *Ibid.* Worldatlas; *Ibid*. Sautter & Pourtier; The Chambeshi River (11°28′S 30°21′E, insiginficant in size and in runoff) is claimed by some sources to be the longest headstream of the Congo River because it discharges (although indirectly) in the Congo River. Details on the Chambeshi River available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=Chambeshi_River&params=11_28_S_30_21_E_region:ZM-04_type:waterbody_source:kolossus-dewiki.* accessed on 19 April 2019; See details concerning the states that comprise the Congo River basin in section 5.2.1 above; Section 1.7 above defines this thesis'limitations. It states that the eastern tributaries of the Congo River are excluded from the thesis analysis, despite their connection with the Congo River, which occurs generally through the Lualaba River (see table 6 below on the tributaries of the Congo River).

the other nine states that constitute the Congo River basin.[973] Even though there are many countries that form the Congo River Basin, the DR-Congo, the Republic of the Congo, the Central African Republic and the Republic of Angola contribute together with more than 90 percent to the waters that flow through the Congo River.[974] Because of that, they are regarded as the main riparian states of the Congo watercourse.

Table 5: Volume of waters inflow
in the countries of the Congo River Basin

Country	Domestic water resources (km^3/year)	Total amount of waters (km^3/year)	Dependence on incoming flows from neighbouring countries (%)
Angola	184,00	184,00	0
Burundi	3,60	3,60	0
Cameroon	273,00	285,50	4
Congo	222,00	832,50	73
CAR	141,00	144,40	2
Gabon	164	164	0
RD-Congo	900,00	1.283,00	30
Rwanda	5,20	5,20	0
Tanzania	82,20	91,0	10
Zambia	80,20	105,20	24
Total/mean	2,262,18	3,333,08	

Source: CICOS [975]

As reveals table 5 above, 60 percent of the countries of the Congo River basin receives significant amounts of water resources from transboundary streams. The DR-Congo occupies the head of these states, with a rate of "dependency" on transboundary

[973] See section 5.2.1 above for details on the states that are included in the Congo River basin. See also note 887 above.

[974] These four riparian countries represent roughly 90 percent of the Congo River's waters. The consulted literature is not constant with respect to the number of the basin countries that are included I the Congo River basin. Sources have often mentioned 10, 11, 12 or even 14 basin States for in the Congo River basin. See Wouters (notes 774 above); Beyene *et al.* (note 38 above; 3); UNEP (a) (note 35 above; 41).

[975] CICOS (note 904 above; 19).

waters estimated to about 30 percent.[976] The DR-Congo is followed by Zambia that has 24 percent of dependency on transboundary waters, whereas states such as Gabon and Rwanda have no dependency vis a vis any transboundary water resources.

The tributaries of the Congo River include the Ubangi, the Sangha, (flowing from the North), and the Kasaï River (flowing from the South), the Lualaba, Lomami, Luvua, and Lukunga Rivers that flow from the South-East, and the Tanganyika Lake that is situated eastwards.[977] The Ubangi, the Sangha, and the Kasaï Rivers westwards, and the Tanganyika Lake eastwards are regarded as the Congo River's main transboundary tributaries.[978] Table 6 below provides some hydrological characteristics of these different tributaries rivers. As already mentioned,[979] both the Congo River and its tributaries are part of a vast ecosystem, which is formed by the Congo basin's rainforest.

Table 6: The Major Tributaries of the Congo River[980]

Tributary	Status	Riparian	Length (km)	Water flow (m^3/sec)
Kasaï	Transb.	Angola, DRC	2,000	12,000
Ubangi	Transb.	Congo, CAR, DRC	2,272	5,936
Sangha	Transb.	Cameroon, Congo, DRC	790	2,471
Lualaba	Transb.	DRC	1,800	-
Lomami	Domestic	DRC	1,500	837
Luvua	Domestic	DRC	350	280
Lukuga	Domestic	DRC	350	271

Source: CICOS.[981]

[976] The "dependency" that is observed here is rather a physical dependency than an economical dependency.

[977] On the tributaries of the Congo River, see Runge (note 971 above; 293-309).

[978] The Lukuga River is a outlet of the Tanganyika Lake. It covers nearly 350 km long with a flow rate is about 271 m^3/s. It discharges into the Lualaba River, which is the upper section of the Congo River. History recalls that before the year 1878, the waters of the Lukuga River flowed into the Tanganyika Lake. Because of tectonic movement and perhaps the rising water level in the lake, the current of the Lukuga has shifted in the opposite direction, flowing towards the Congo River; *Ibid*. Runge.

[979] See section 5.2.1 above.

[980] CICOS (note 904 above; 19); "Transb." Stands for transboundary.

[981] *Ibid*.

5.3.3 The Hydrographical characteristics of the Congo River

The Congo River's main channel measures approximately 4,374 kilometres long,[982] which geographers divide into three sections, namely the upper, the middle, and the lower Congo River.[983] Even if this subdivision was initially undertaken for navigational and hydrographical purposes, the physical basis on which it was made makes it useful to this thesis.

The upper Congo River section measures more than 2000 kilometres long. It includes the Tanganyika Lake and the Congo/Lualaba River.[984] The Tanganyika Lake is an eastern transboundary lake that discharges into the Congo River via the Lukuga River.[985] It is situated 6°30' S and 29°50' E,[986] stretches in an area as vast as 33,000 km², and an average depth of about 600 m.[987] The total volume of the waters of the Tanganyika Lake is about 19,000 cubic meters. The Lake's waters are approximately the sixth of the total volume of the world's accessible freshwaters.[988] It also has an exceptional environment, comprising famous endemic lineages of species of fish, and more than 1500 different plant and animal species, of which half can not be found anywhere else on the planet.[989]

The Lualaba River is the second major tributary of the Congo River at its lower section.[990] It is situated 2°8'52'' N and 22°28'55'' E and is 1,800 kilometres long.[991] The Lualaba receives its waters from the Lukuga River, which empties the waters of the

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[982] Runge (note 971 above; 309).

[983] *Ibid*.

[984] *Idid*.; For further details, see Harrison (note 916 above; 1-18).

[985] *Idid*.

[986] Information available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=Lake_Tanganyika&params=6_30_S_29_50_E_type:waterbody_scale:2500000* , accessed on 25 September 2019.

[987] The Tanganyka Lake has a maximum depth of 1500 m. See Runge (note 971 above; 296).

[988] Scientist claim that its current pool was filled with water for at least ten million years whereas some sediments date from a period two times older. See Runge (note 971 above; 296).

[989] *Ibid*. Runge.

[990] *Ibid*. at 293.

[991] *Ibid*. at 295. See for the Lualaba River's geographic coordinates: *https://tools.wmflabs.org/geohack/geohack.php?pagename=Lualaba_River&params=2_8_52_N_22_28_55_E*accessed on 17 September 2019.

Tanganyika Lake into the Lualaba River.[992] The Lualaba becomes the Congo River downstream, in the Congo River's middle section, near the city of Kisangani.[993]

The middle section of the Congo River is approximately 1500 kilometres long, beginning southwards at Kisangani, around the Boyoma Falls and ends at the Malebo Pool.[994] Most of the tributaries of the Congo River drain into its flows in this middle section, which results into a significant increase of the volume of the river's waters through the main channel of the Congo River.[995] These tributaries are discussed here below; they include the Ubangi, the Sangha and the Kasai Rivers.

The lower section of the Congo River is approximately 498 kilometres long.[996] It starts at the outflow of the Malebo Pool, includes the lower Congo River rapids, including the Inga rapids, and runs down to the mouth of the Congo River at the Atlantic Ocean, Banana, in the Congo Central Province. The middle and the lower sections of the Congo River form a significant section of the boundaries between the DR-Congo and the Republic of the Congo, and the boundaries between the DR-Congo and the Republic of Angola.[997]

5.4 The transboundary tributaries of the Congo River

5.4.1 The Kasai River

The Kasai River is a transboundary water system shared between the Republic of Angola and the DR-Congo.[998] It is located on the left side of the Congo River, between 10^0 57'37''

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[992] Runge (note 971 above; 293-294); See also M. Shahin 'Hydrology and water resources of Africa' (2006) *Sp Sc & Bus Med* , 335.

[993] *Ibid*. Runge.

[994] Harrison (note 916 above; 6).

[995] *Ibid*.

[996] *Ibid*.

[997] Runge (note 971 above; 296).

[998] *Ibid*. Runge; For further information on the Kassai River, see J. Deviîoey *Le Régime hydrographique du Kasai* (1940), 44. Available at *www.vliz.be › imisdocs › publications › ocrd ,* accessed on 10 August 2019.

S and $19^{0}18'56''$ E.[999] The Kasai River is the dominant tributary of the Congo River and the outlet of the Kasai River basin. Approximately 27.6 percent of the Kasai River basin is situated in the Republic of Angola, against 62.4 percent in the DR-Congo.[1000] The Kasai River discharges into the Congo River with a flow rate of approximately 12,000 cubic metres per second. [1001]

The Kasai section of the Kasai watercourse begins in the central region of Angola, wherefrom it flows eastwards, until reaching the boundary between the Republic of Angola and the DR-Congo. From this point of intersection, the Kasai then turns northwards, defining the boundary between the two countries in a distance of hundreds of kilometres before entering entirely into the territory of the DR-Congo.[1002] Although there are many rivers of smaller sizes that cross the boundary between the DR-Congo and the Republic of Angola, the Kasai, Kwango and Kwilu Rivers are the most important ones.[1003]

The Kasai River comprises three main tributaries that originate from the Republic of Angola, and that all run northwards into the territory of the DR-Congo.[1004] These include the upper section of the Kasai River, and the Kwilu, and Kwango Rivers;[1005] Once inside the territory of the DR-Congo, these two rivers discharge themselves into the upper section of the Kasai River to form the great Kasai River, which will in turn discharge in the Congo River, northeast of Kinshasa.[1006] Other rivers equally crucial, such as the Sankuru, the Lulua, and the Fimi Rivers, also discharge into the Kasai River before it discharges in turn in the middle section of the Congo River.[1007] Map 4 below gives an idea

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[999] Information available at: *https://tools.wmflabs.org/geohack/geohack.php?pagename=Kasai_River&params=10_57_37_S_19_18_56_E_region:AO-LSU_type:river*, accessed on 14 July 2019.

[1000] E. Devroey *Le Kasaï et son bassin hydrographique* (1939), 10.

[1001] *Ibid*.

[1002] *Ibid*.

[1003] All these rivers bear the same names on the Angolese territory, but with slightly different spellings: Kwango for Cuango, Kwilu for Cuilu, Kasai for Casai on the Angolese side.

[1004] Runge (note 971 above; 296); Devroey (note 1001 above; 44).

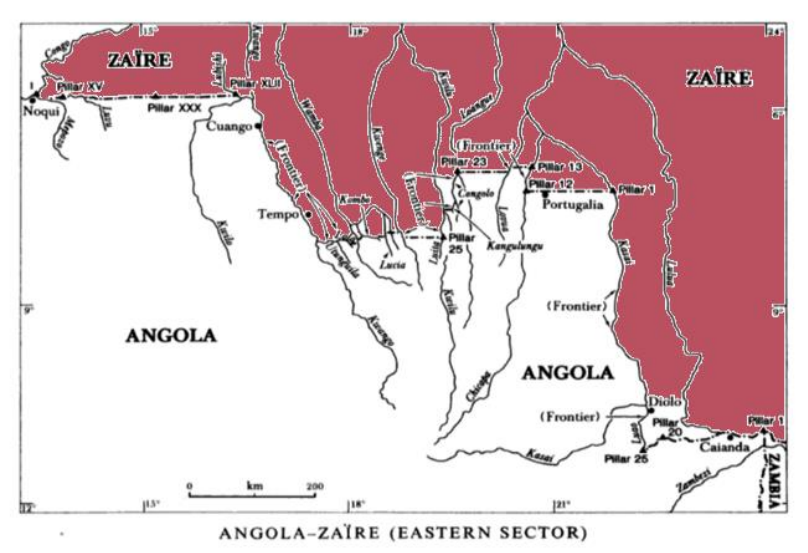
[1005] Harrison (note 916 above; 5-6); See CICOS (note 918 above; 20).

[1006] Runge (note 971 above; 296).

[1007] Devroey (note 1001 above; 53).

of the network formed by the transboundary rivers that flow in the DR-Congo from the Republic of Angola.

Map 3: Network of streams that forme the
Kasai sub-River basin crossing the Angolan boundary



Source: I. Brownlie & I.R. Burns.[1008]

Besides its water resources and its tropical rainforest, the Kasai sub-river basin comprises abundant reserves of diamonds. Some reports claim that 60 percent of the diamonds that reach Belgium come from the Kasai River.[1009] However, political and public attention to that part of the Congo River basin was put mainly on the diamonds than on any other natural resource. War and security concerns were also a primary concern for that part of the Congo River basin, given that the Northern part of the Republic of Angola was under Jonas Savimbi's rebellion for more than two decades. This further explains the relative lack

[1008] I. Brownlie & I.R. Burns *African boundaries: a legal and diplomatic encyclopedia* (1979), 491. (Zaire is the former name of the current DR-Congo from the year 1971 to 1997).

[1009] Roughly 60 percent of diamonds that reach Belgium come from the Kasai River. See for more details on the Kasai River: Devroey (note 1001 above); See also E. Polinard *Les gisements de diamant du bassin du Kasai au Congo Belge et en Angola* (1951), available at *http://www.kaowarsom.be/documents/MEMOIRES_VERHANDELINGEN/Sciences_naturelles_medicales/Nat.Sc.(IRCB)_T.VII,6_POLINARD,%20E._Les%20gisements%20de%20diamants%20du%20bassin%20du%20Kasa%C3%AF%20au%20Congo%20belge%20et%20en%20Angola_1951.PDF* , accessed on 10 June 2019.

of treaties regarding transboundary water resources in this part of the Congo River basin.[1010]

Water resources of the Kasai River system, namely the Kasai, Kwilu, and Kwango Rivers were covered either by conventions, or by treaties, or declarations between the Belgian government and Portugal for the Angolan counterpart. The Lisbon Convention of May 25, 1891, the Convention of July 22, 1927, for boundary alignment between the two states, and the declaration of March 24, 1894, are all examples of boundaries Agreements passed between the two states.[1011] However, these Agreements were mainly concerned with boundary definition between the two new African states and did not cover any other aspect concerning water resources. These treaties that date back to the pre-colonial and colonial epochs have never been revisited in the sense of upgrading their contents to the evolving context of shared water resources.[1012] Table 7 below gives an overview of both the Kasai sub-river basin and the Kasai River and its tributaries.

Table 7: the main transboundary rivers between the DR-Congo and Angola that discharge into the Kasai River

River	Length (km)	Flow rate (m^3/s)	Outlet	Coordinates
Kasai	2,153.00	12,000	Congo River	$10^0$57'37''S and $19^0$18'56'' E
Kwango [1013]	1,800.00	2,700	Kasai River	3^0 14.666' S and 17^0 22.416' E
Kwilu	965.00	-	Kasai River	$3^0$23'07'' S and 17^0 23' 04'' E
Uamba	880.00	-	Kwango River	-

Source: This thesis' own compilation.

[1010] Further details on Jonas Savimbi, see V. Brittain *Jonas Savimbi, 1934–2002* (2002), 128-130.

[1011] For issues regarding treaties signed on the boundary forming waters between the DR-Congo and Angola, see generally: Brownlie & Burns (note 1009 above; 489-514). These treaties can be consulted under: *Treaties concerning the non-navigational uses of international watercourses* – Africa available at *http://www.fao.org/3/W7414B/W7414B00* , accessed on 18 July 2019.

[1012] *Ibid*.

[1013] Available at *https://encyclopedia.thefreedictionary.com/kwango+River*, accessed on 24 April 2019.

5.4.2 The Ubangi River

The Ubangi River (spelt sometimes "Oubangui") is a northern transboundary tributary of the Congo River. It extends from latitude 00°30' S to 09°16' N, and longitude 15°35' E to 30°57' E, and covers a surface estimated to about 643,900 square kilometres.[1014] The Ubangi River is shared between the DR-Congo, the Republic of the Congo and the CAR. With its 2,300 kilometres of length, the Ubangi is the longest tributary of the Congo River.[1015] As shows map 4 below, the Ubangi is part of the northern boundary between the DR-Congo and the CAR, and also the north-western boundary between the DR-Congo and the Republic of the Congo.[1016] In conjunction with the Middle section of the Congo River, the Ubangi forms a stretched boundary of about 2,410 kilometres between the DR-Congo, the Republic of the Congo and the CAR, as illustrates map 4 here below.

Map 4: The network of streams that form the Ubangi Sub-River basin

Source: *https://wikivisually.com/wiki/File:Ubangirivermap.png , accessed on 24 July 2019.*

[1014] Information available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=Ubangi_River&params=0_30_S_17_42_E_* , accessed on 24 September 2019; Runge (note 971 above; 303).

[1015] Harrison (note 916 above; 6); Devroey & Campenhout (note 956 above; 24).

[1016] See Map 4 below.

Similar to the Ubangi River, the Ubangi sub-river basin is a transboundary river basin that includes the DR-Congo, the Republic of the Congo, and the Central African Republic. A significant portion of the Ubangi River basin is located in the CAR, followed by the DR-Congo and the Republic of Congo. The Ubangi River receives from the DR-Congo some important tributaries, including the Lua (131 kilometres) and the Ngiri (177 kilometres).[1017] Table 8 below gives an overview of the portions of the Ubangi River basin that is shared between its three riparian countries.

Table 8: Repartition of the Ubangi River basin between the CAR, the DR-Congo and the Republic of the Congo

Country	Country Share in the basin size (km^2)	Percentage in the Basin (%)
Central African Republic	352,000	55.00
DR-Congo	254,800	39.00
Republic of the Congo	37,900	6.00
Total	643,900	100.00

Source: Devroey & Campenhout.[1018]

The hydrographic reconnaissance of the Ubangi River was carried out from the year 1910 to 1911 by the "Congo-Ubangi-Sanga" mission under the direction of the French Mr H. Roussilhe.[1019] Roussilhe's studies mainly concerned the determination of the geographical positions, topography, soundings, floods, and currents of the flow of the Ubangi River;[1020] they also enabled the establishment of a comprehensive program of management to support the international navigation on this vital transportation route.[1021] However, the variations of the Ubangi's flow, which are attributed by some to climate change, have significantly degraded the river's conditions of navigability.[1022]

[1017] Devroey & Campenhout (note 956 above; 24).

[1018] *Ibid*. at 105.

[1019] *Ibid*.

[1020] *Ibid*.

[1021] *Ibid*.

[1022] *Ibid*.

Navigation that was once permanent on this waterway is impossible for several months a year. Some studies have reported a complete drying of some of the northern tributaries of the Ubangi River, in explanation of the drying up of the river itself.[1023] The current drying up of the Ubangi River is a critical factor in consideration of the projects of water transfer from the Ubangi sub-basin to the Lake Chad basin mentioned downwards.[1024]

5.4.3 The Sangha River

The Sangha River is one of the main tributaries of the right bank of the Congo River. It originates from the Republic of the Congo and extends from latitude 1°12' 45'' S to 16° 49' 40'' E.[1025] The Sangha measures 790 Kilometres long, of which 710 kilometres are navigable and serve for the evacuation of logs in the south-western regions of CAR and the south-eastern regions of Cameroon.[1026] It discharges in the Congo River at longitude 15°20'E, 465 kilometres upstream of Brazzaville, on the side of the Republic of the Congo.[1027] Entirely located in the northern hemisphere, the Sangha River basin measures roughly 240,000 square kilometres and covers the Republic of the Congo and Cameroon.[1028]

[1023] *Ibid.*

[1024] See section 5.6.2 below; see also A. Tairo 'Saving River Congo from drying up' (November 27, 2019), available at *https://www.theeastafrican.co.ke/scienceandhealth/Saving-River-Congo-from-drying-up/3073694-5364210-j2bnyg/index.html*, accessed on 26 July 2019.

[1025] Information available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=Sangha_River&params=1_12_45_S_16_49_40_E_type:waterbody&title=Sagha+River+mouth* , accessed on 19 May 2019.

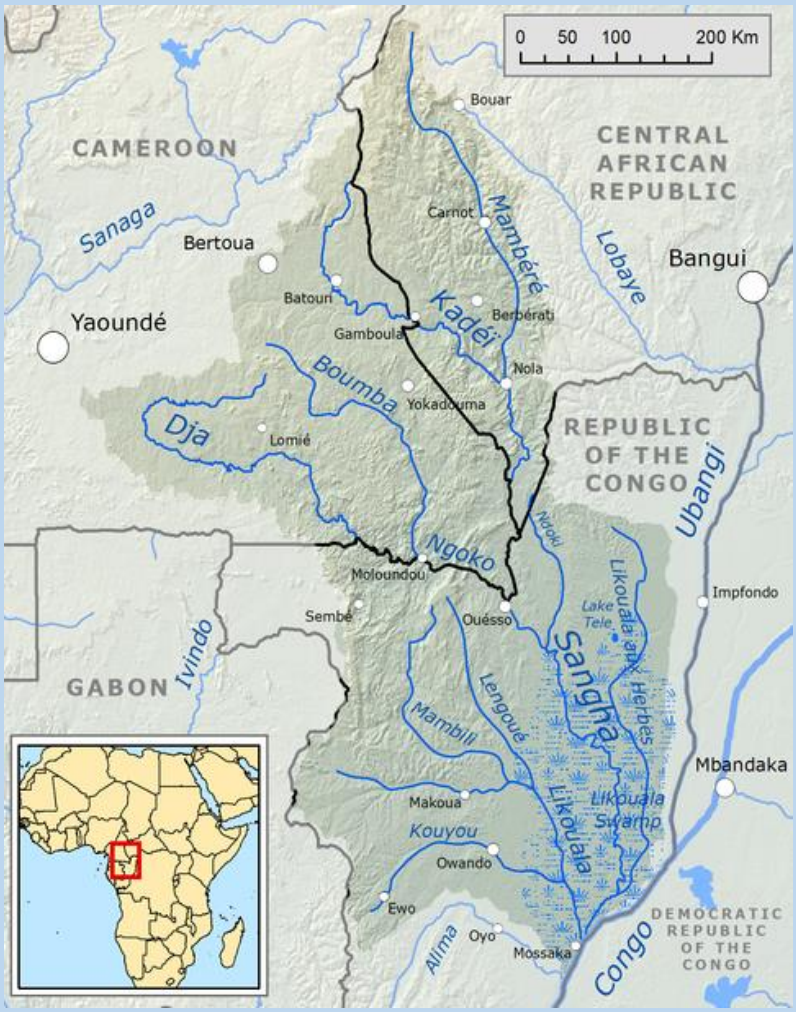
[1026] CICOS (note 918 above; 19-20).

[1027] Brazzaville is the capital city of the Republic of the Congo. It's situated 4°16′04″ S and 15°16′31″ E.

[1028] Information available at *https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Congo-Centrafrique-Tchad-RDC_-_Etude_de_la_route_Ouesso-Bangui-N_djamena_.pdf* , accessed on 12 May 2019.

The most significant tributary of the Sangha River is the N'goko River,[1029] which serves as a boundary between the Republic of the Congo and Cameroon. The Sangha River has a maximum flow rate of approximately 3,504 cubic meters per second, which in general occurs during the flood periods, around October and November.[1030]

Map 5: Network of streams that form
the Sangha sub-River basin



Source: *https://en.wikipedia.org/wiki/File:Sanghabasinmap.png ; accessed on 24 July 2019.*

5.4.4 Some additional potentialities associated with the Congo watercourse

The Congo River is endowed with the highest diversity of freshwater fish species of the African continent,[1031] and the second globally, after the Amazon River. Besides, Harrison[1032] argues that such considerable biodiversity in freshwater fishes in the basin is possibly due to the extensive and dense hydrographic web and geomorphic stability of the Congo water system. Besides, the Congo River and its tributaries possess an immense

endowment in hydro electrical energy potential, which is estimated to nearly 100,000 MW per year.[1033] The sole Inga rapids, situated in the lower section of the Congo River, has an unexploited hydropower potential of more than 40,000 MW per year.[1034]

The exploitation of this enormous potential is already planned but relies on regional cooperation for funding because the government of the DR-Congo lacks the necessary funds for the project.[1035] Despite such a potential, the national rate of electrification of the DR-Congo revolves around 14 percent, against an average of 20 percent in the whole Congo River basin, and 42 percent across the African continent.[1036]

The low level of the basin's hydropower generation is foremost a question of lack of adequate infrastructures. It is also the result of weak maintenance of the existing equipment, which is caused by the basin's recurring political instabilities.[1037] The small density of most of the basin's states, dominated by its low-income rural population has generally hampered the development of infrastructures destined to electricity generation, especially in areas where electricity seems to be the most needed. For some observers, high operating expenses are generally unbearable to rural communities.[1038]

[1033] *Ibid*. at 10. Despite such potential, the country is producing only 3,000 MW of electricity per year as of 2019.

[1034] International Rivers 'Hydropower for Mines and Export, Not the Poor' available at *https://www.internationalrivers.org/resources/congo%E2%80%99s-energy-divide-factsheet-3413* , accessed on 10 June 2019.

[1035] In February 2005, the South African national electricity company, Eskom, announced a proposal to dramatically increase the capacity of the Inga Dam in the lower section of the DR-Congo through an improvement of the existing infrastructures and the construction of a new hydroelectric dam. See for more details Linda van Tilburg 'South Africa to double up on investment in Congo's Inga 3 dam – a risky move?' available at *https://www.biznews.com/energy/2019/01/21/south-africa-double-power-congo-hydro-plant,* accessed on 14 June 2019.

[1036] Despite the country's potential, the country is producing only 3,000 MW of electricity per year as of 2010. Information available at UNEP (a) (note 35 above; 43).

[1037] *Ibid*.

[1038] *Ibid*.

5.5 Issues concerning the internationality of the Congo River

There exists a threefold longstanding concern regarding the international status of the Congo River, which the insignificant political attention that has been given to the basin's shared water resources since the post-independence period has not helped clarify.

The first concern stems from the hydrographical configuration of the Congo River, which, from its birth south-eastwards to its discharge in the Atlantic Ocean south-westwards, runs exclusively within the territory of the DR-Congo as illustrated by map 6 below.[1039] On its way to the Atlantic Ocean, the Congo River forms an arc that runs first from the south of the DR-Congo to its north, then turns westwards, and eventually southwards to finally discharge into the Atlantic Ocean south-westwards.[1040] In that trajectory, the Congo does not traverse the territorial boundaries of the DR-Congo but instead stays within this country until its discharge into the Ocean.[1041]

The second concern touches on the Congo River's overall hydrology. Although running exclusively from within the DR-Congo's territory, this river receives one-third of its waters from the other riparian states of the Congo River.[1042] These transboundary sources reach the Congo River by runoffs or through some transboundary rivers that are the tributaries of the Congo River, as discussed in the previous sections. In other words, the other riparian countries of the Congo watercourse contribute to one-third of the waters that flow in the Congo River, whereas the DR-Congo contributes with the remaining two-thirds.[1043]

The third concern is that the Congo River is a boundary-forming river between the DR-Congo and the Republic of the Congo. The 1911 Madrid Declaration mentioned earlier observed that states that had a river between them as a boundary were "in a position of permanent physical dependence on each other, which precludes the idea of the complete autonomy of each State in the section of the natural watercourse under its

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[1039] See annexe 6 below.

[1040] See UNEP (a) (note 12 above; 41).

[1041] *Ibid.*

[1042] *Ibid.*

[1043] *Ibid.*

sovereignty."[1044] Out of its 4,700 kilometres length, the Congo River forms more than 660 kilometres of a boundary between the two Congos (from the city of Brazzaville to the confluent of the Congo River and the Ubangi River),[1045] while the remaining of the river flows within the DR-Congo.

Based on the above concerns regarding the international status of the Congo River, reflections have to be pushed further, as per Article 3 of the 1997 UNWCC, which recommends to the riparian states of shared water systems to take into account all the particularities of an international watercourse while planning to sign transboundary water treaties. In the case of the Congo River, what the particularities of the river may be, and what could such particularities imply in terms of the internationalisation of the Congo watercourse? Is it the whole Congo River that has to be regarded as having an international status, or only some of its sections as presented above? If only some of the Congo River's sections would be considered international, which sections would these be? And upon which basis will such a differentiation be decided?

The fact that the Congo-River runs exclusively within the territory of the DR-Congo is not a mere geographical coincidence. It was an express and positive will of King Leopold II of the Belgians who was the first proprietor of the territory that has become the DR-Congo, which he personally owned from 1885 to 1908.[1046] King Leopold II wanted to have a possession in the heart of Africa that included the whole Congo River.[1047] He sought the control of the whole Congo basin (although he could not have it), and was aware that he could not realize such a dream without first controlling the waterway constituted by the Congo River and its tributaries. As mentioned earlier,[1048] the Congo water system was in the precolonial era especially, the only way of communication into the deepest parts of Africa.

[1044] Paragraph 1 of the Declaration of Madrid of April 20, 1911".

[1045] See section 5.2.4 above.

[1046] A.B. Keith *The Belgian Congo and the Berlin Act* (1919), 31-41. Available at *https://archive.org/details/belgiancongoberl00keit/page/n6 , a*ccessed on 28 January 2019.

[1047] *Ibid*. at 57-65.

[1048] *Ibid*. at 31-41.

After realising that the French already occupied the left bank of the Congo River King Leopold II understood that it was no longer possible for him to control that part of the Congo Basin (the left bank is the land situated at the left hand of an observer that have his back turned towards the mouth of the Congo River and its face turned upstream). King Leopold II sought, therefore, to control the whole of the region situated on the right bank of the Congo River, which included the Ubangi River northwards.[1049] This is how King Leopold II managed to domesticate the *Great Congo River* and include it in the *Congo Free State,* which was his possession in Africa. It was in 1908 that King Leopold II passed to Belgium the whole *Congo Free State*, which then became the *Belgian Congo*, thus marking the onset of colonisation.[1050]

The DR-Congo, which is the continuation of first the Congo Free State and then the Belgian Congo, has inherited of the Congo River situated within its national boundaries. However, as discussed earlier,[1051] the now codified international law of transboundary water resources provides a legal framework to regulate matters regarding the transboundary watercourses. The approach of this new legal framework concerning the international status of the world's transboundary rivers such as the Congo River is different from the historical approach that has been followed by the DR-Congo. As discussed earlier, Article 2.b of the 1997 UNWCC defines an international watercourse as a watercourse, parts of which are situated in different States.[1052] Whereas Article 2.a of the same treaty defines a watercourse as a system of interconnected surface waters and groundwaters that constitute a unitary whole, as they flow into a common terminus.

Under these two provisions, the "Congo watercourse", which refers to "the Congo River and its tributaries" is indeed an international water system.[1053] However, the Congo River which has three sections, as explained above,[1054] what would be the status of each of these three sections? If an international status will be grafted to the whole Congo

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[1049] *Ibid*. at 57-65.

[1050] *Ibid*.

[1051] See section 4.4. above.

[1052] Article 2.a. of the 1997 UNWCC.

[1053] See more explanations on the internationality of transboudary watercourses in Rieu-Clarke *et al.* (note 277 above; 77).

[1054] See section 5.3.3 above.

River, all the three sections would, therefore, be included. In other words, from its source to its mouth, the Congo River would be considered an international river; yet, the upper and the middle sections of the Congo River especially are completely immersed within the territory of the DR-Congo alone.

Following the above reasoning, if the Congo River, would in these circumstances be declared a wholly international river, due to the fact that the river is part of the Congo watercourse, what then will be the status of the Congo River's transboundary tributaries, especially those that originate from within the territory of only one state, and where they are considered "domestic rivers"? The Sangha River for instance, which was discussed earlier,[1055] which runs through the territories of the Republics of Cameroon and Congo. The Sangha River discharges in the Congo River from within the territory of the Republic of the Congo, wherefrom this river is regarded as a domestic river, as it flows from Cameroon. What then will be the extent of the international status of the Sangha River? Will such status mean that the Sangha River is to be shared with any other riparian state of the Congo watercourse? Or will such status imply that the riparian states of the Congo watercourse, other than Cameroon and the Republic of the Congo are granted the right to freely use the Sangha River inside the territory of its two direct riparian states?

All the issues raised above lead to the main question that is: "does the application of the 1997 UNWCC regime on transboundary watercourses imply a partial abolishment of the domestic status of the transboundary watercourses?" Under the regime of the 1997 UNWCC as seen previously,[1056] a water flow, tributary, lake, or groundwater would have an "international" status if there exists a natural link between such a waterbody and the other flows that connect to the final outlet of the river basin. Such internationality is valid even if such a water body is to be found entirely within the territory of a single riparian state, despite its natural connection to the rest of the basin's water system. Which means that, even if the Congo River is wholly internal vis a vis the DR-Congo as explained above,[1057] it receives some of its waters from outside the country, from transboundary tributaries.

[1055] See section 5.4.3 above

[1056] See section 2.4.2 above .

[1057] See section 5.3 above; See also map 6 in annexe 6 below.

The internationality of a river is a physically established matter and not the result of a political decision. However, the politics of shared water resources can be rigid to change if the physical facts that constitute the bedrock of such politics are not clarified with satisfaction. As Bearden[1058] observes, the decision to include in the watercourse concept a river's tributaries, lakes, and any water flows or groundwaters connected to it, constituted an essential innovation in the 1997 UN Water Convention and its regime. Although many states have shown themselves sceptical about some features in the regime established under the 1997 UNWCC, they will nonetheless, observe it as time goes by, and adjust their approach to transboundary waters treaty to match its provisions, namely its Article 3.[1059]

Concerning the regime that governs the Congo River, much clarity will be provided in Chapter 6 below, which will analyse the legal regime thereof. However, because of the interconnectedness explained above, an international status indeed applies to the Congo River, which, nevertheless, should be put into perspective.[1060]

5.6 Climate change impacts on the Congo watercourse

Scholars such as Mccartney & Smakhtin, and Brisman *et al*.[1061] have argued that there will be either too little or too much water at different locations across the globe, but rarely the same amount of waters, as a result of climate change. While analysing the potential consequences of climate change on the hydrology of the Congo River Basin, Beyene *et al*.[1062] discovered that there would be an increase of approximately 10 to 15 percent of the run-off across the basin, and an increase of 11 to 17 percent of the Congo River's discharge by the year 2050. As said above,[1063] these increases will be particularly high during the wet

[1058] Bearden (note 268 above; 1005).

[1059] See section 4.4.5 above.

[1060] Rieu-Clarke *et al.* (note 277 above; 77).

[1061] M. Mccartney & V. Smakhtin *Water storage in an era of climate change: addressing the challenge of increasing rainfall variability* (2010) *Blue paper*, 1; Brisman *et al.* (note 8 above; 54).

[1062] V. Garderen *et al. '* Climate change adaptation options for the Congo Basin countries' In Linda & Ludwig (Eds.) *Climate change scenarios for the Congo Basin*. (2012) CSC 167, 167; Beyene *et al.* (note 38 above; 10).

[1063] See section 1.2 above.

seasons, as compared to the dry seasons.[1064] Besides, the same authors predicted for the end of the current century an increase in the basin's run-off of approximately 23 to 27 percent, against an increase in the discharge of the Congo River of approximately 18 to 73 percent.[1065] These predictions reveal an increase in the availability of waters across the Congo river basin while there will be a decrease in water availability in most of the river basins in Africa.

The above picture suggests that climate change will, in general, cause an increase in the frequency and intensity of drought and floods, and thus result in population displacements, or material damages and loss.[1066] Water scarcity or drought, and other extreme events are also some of the primary effects of the phenomenon, channelled through waters. Too little or too much water can be a direct or an indirect driver of people displacement, material damages, as well as a range of other societal costs.[1067] It is common knowledge that regardless of the geographical location, poor and marginalised populations are the more exposed and vulnerable to these adverse impacts of climate change. The next sections are not going to re-discuss the impacts on climate change on water resources but to pinpoint a category of direct and indirect impacts that are more specific to the Congo River and its riparian states.

5.6.1 Direct impact

Recently, studies have examined the impacts of climate change on the Congo River basin to reach a better understanding of the effects of the phenomenon in this natural resources-rich part of the world.[1068] Results of the investigations led to different conclusions, of which some were contradictory and others conclusive, perhaps due to a relative lack of previous climate-specific information on the Congo River basin.

[1064] Garderen *et al.* (note 1063 above; 18).

[1065] *Ibid*. at 18-20.

[1066] See generally the *Global Report on Internal Displacement* (2019). Availableat *http://www.internal-displacement.org/global-report/grid2019/downloads/report/2019-IDMC-GRID-summary.pdf*, accessed on 12 July 2019.

[1067] *Ibid*.

[1068] See for instance A Haensler (Eds) *Climate Change Scenarios for the Congo Basin* (2013); Harrison (note 916 above); Chishugi (note 942 above; 2).

The first conclusions which will be invoked in this thesis confirm significant impacts of climate change on the hydrology of the region before the year 2100.[1069] These studies suggest that there will be a general increase in the Congo River's discharge in the order of 11-17 percent by the year 2050 and an increase in the basin's run-offs in the order of 18 to 27 percent by the end of the current century.[1070] From a temperature point of view, most of the scenarios indicate significant warming towards the end of the current century, which will happen regardless of the seasons, whether dry or wet.[1071] It further confirms that the annual warming will be between +1.5 and +3.0 degrees Celsius on average, for the optimistic scenario, and +3.6 and +6.0 degrees Celsius on average, for the pessimistic scenario.[1072]

The study of Garderen and Ludwig,[1073] which focused on the impacts of climate change in the Congo River Basin, brought similar results as it predicted the Congo River's waters to increase by up to 10 percent in the coming decades. However, besides these predictions, Garderen[1074] indicated that the overall run-off and river flow across the Congo River basin would rise, especially in the wet season, but decline in the dry season, despite the current transitional episode characterised with lesser water resources. For Garderen,[1075] there is a substantial likelihood of a 50 percent increase in the run-off of the basin during the wet season, which makes experts fear significant flood risks, especially in the central and western part of the basin.

The second scenario suggests the unlikeliness that drastic changes (in terms of annual rainfall levels) may occur across the basin in the foreseeable future. The scenario mentions, instead, significant changes of more than 30 percent in the regime of precipitation, which will be marked, on the one hand, with prolonged and more frequent periods of droughts, and on the other hand with an increased intensity of rains in most areas across the basin. This scenario further suggests that dry seasons will become drier, whereas

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[1069] F. Ludwig *et al.* 2013. Climate change impacts on the congo basin region. In A. Haensler *et al*. (eds.) *Climate Change Scenarios for the Congo Basin* (2013), 2192-4058.

[1070] Beyene *et al.* (note 38 above; 18-20).

[1071] CICOS (note 918 above; 23).

[1072] *Ibid*.

[1073] Garderen *et al.* (note 1063 above; 167); Beyene *et al.* (note 38 above; 3).

[1074] *Ibid*. Garderen; *Ibid*. Beyene.

[1075] Beyene *et al.* (note 38 above; 10).

wet seasons will become wetter, and excludes any hypothesis of widespread water scarcity across the basin. Finally, this scenario recommends to the states of the Congo River basin to consider and plan ahead of the predicted floods, because there is a strong likelihood the region will be experiencing frequent floods in the western and central parts of the basin.[1076]

In the same order of ideas, a recent study, which is summarised in table 9 further, has ranked the countries of the Congo River basin among the most vulnerable countries on the planet regarding a series of indicators that relates to state preparedness to climate change.[1077] This study touched the projected change of annual runoff and took into consideration a range of other sub-factors such as the annual character of groundwater recharge, the withdrawal rate of freshwaters, the water dependency ratio, the capacity of dams, and the access to reliable drinking water.[1078]

[1076] Ministry of Foreign Affairs of the Netherlands *Climate Change Profile Democratic Republic of the Congo (East)* (2018), 4. available at *https://reliefweb.int/sites/reliefweb.int/files/resources/DRC%2B%28east%29.pdf* , accessed on 11 July 2019.

[1077] The ND-GAIN Water score captures a country's vulnerability to climate change in terms of fresh water supplies. Indicators include: projected change of annual runoff, changes contemplated in the index includes annual groundwater recharge, fresh water withdrawal rate, water dependency ratio, dam capacity, and access to reliable drinking water. More information on the ND-GAIN index available at *https://gain-new.crc.nd.edu/ranking/vulnerability/water* , accessed on 24 June 2019.

[1078] See The ND-GAIN Country Index in table 9 below.

Table 9: The ND-GAIN Country Index ranking countries of the Congo River basin among the most vulnerable concerning the '*water and climate change index'*

Ranking (192 countries)	Country	Index level
12	Burundi	0.198
25	Rwanda	0.216
30	CAR	0.228
32	Zambia	0.230
74	Gabon	0.300
97	Cameroon	0.334
124	Tanzania	0.366
130	Angola	0.380
161	Republic of the Congo	0.442
163	DR-Congo	0.455

Source: *https://gain-new.crc.nd.edu/ranking/vulnerability/water*, accessed on 24 June 2019.

Table 10: The ND-GAIN Country Index ranking Djibouti and Sudan

Ranking (192 countries)	Country	Index level
1	Djibouti	0.042
177	Sudan	0.692

Source: *https://gain-new.crc.nd.edu/ranking/vulnerability/water*, accessed on 24 June 2019.

As shown by table 10 above, the Republic of Djibouti occupies the first position in the ND-GAIN Country Index ranking list, in contrast to the Republic of Sudan, which occupies the last position.

Despite such variances in the findings of the above studies, conclusions have all shown a sure consistency on the fact that problems due to excess of rainfall will mainly strike the central part of DR-Congo, whereas phenomena such as droughts will mostly

occur southwards and on the edges of the basin during dry seasons.[1079] Two reasons make the excess of rainfall that is predicted to occur in the central part of DR-Congo understandable: firstly, that part of the country is the remains of a prehistoric lake, which act as an outlet of most of the tributaries of the Congo River before their discharge into the Atlantic Ocean. Secondly, the coincidence of the central part of the DR-Congo with the cuvette Centrale, which is the lowest altitude of the Congo River basin. Due to its small elevation, the cuvette Centrale drains by gravitation more waters than elsewhere across the basin.[1080] Also, because of such a low altitude, it is more likely that that part of the basin may suffer more floodings in comparison to the others.

What is also clear is that difference in terms of water availability between the wet and dry seasons will deepen across the basin in comparison to the current situation.[1081] The wet season will become wetter and even characterised by more intense and frequent extreme events. The ultimate logical conclusion would be that basin states are preparing to handle both extremities. The Congo basin states need to prepare for more unstable hydrological regimes, managing excessive amounts of water and probably storing waters to avoid floods during the wet seasons and ensure balanced water supply during the dryer seasons.[1082] Human and artificial intelligence will be forced to replace the providence of nature, which will be increasingly lacking because of climate change.

5.6.2 Indirect impact

Apart from the direct impacts of climate change on the waters of the Congo River basin as discussed above, climate change is likely to impact the waters of the Congo River in an

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[1079] BBC World Service Trust 'Democratic Republic of Congo Talks Climate: The public understanding of climate change' Available at *http://r4d.dfid.gov.uk/PDF/Outputs/MediaBroad/02-Democratic-Republic-of-Congo-TalksClimate.pdf , ac*cessed on 11 July 2019. JH Christensen *et al.* 'Regional climate projections' In S. Solomon *et al.* (Eds.) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*.

[1080] The cuvette centrale is a flat region within the DR-Congo of less than 350 to 500 m above the sea level, measuring some 800.000 km^2 and surrounded by the Congo River. See for more details on the cuvette centrale: *http://www.cuvettecentrale.info/frameContent/home.html* , accessed on 11 July 2019.

[1081] F. Ludwig *et al.* Climate change adaptation and Integrated Water Resource Management in the water sector (2014) 518 *J of Hydr* 235, 238.

[1082] *Ibid.*

indirect way. Indirect impacts in the sense of this section refer to the consequences associated with either the exportation of water resources or the transfer of significant amounts of water outside the Congo River basin in order to supply some remote basins or regions whose water resources are found to be climate change distressed.[1083]

The continual depletion of the waters in some regions surrounding the Congo River basin north and southwards is forming around this basin a belt of aridity.[1084] Because of that, growing pressures are being put on the DR-Congo in particular, and on some few other riparian countries of the Congo watercourse, to accept the undertaking of water transfers either from the Congo River or from one of its tributaries to rescue these water-stressed regions. Among these water-stressed regions are the Lake Chad basin northwards,[1085] and with a lesser extent, the southern African region, whereby there is a growing debate concerning the possibility to undertake a water transfer from the Congo River basin into the region.[1086]

Water imbalance is growing in both axes for two main reasons: *first*, the climate change phenomenon, which is reducing water availability in both axes; *second,* the advancement of the desert, which is aggravating the state of the hydrology in the two regions. The fear is that such situations may at an ultimate stage open ways to water disputes because of the pressures that are being put on the states of the Congo River basin to transfer part of the basin's waters into these water imbalanced regions.[1087]

[1083] IPCC 2014 (c) (note 10 above; 1767); See the Global Report on Internal Displacement (2019).

[1084] UNEP (a) (note 35 above; 133); This African Atlas of water resources has expressely identified the project of transfering the waters of the Congo basin as a potential risk for conflict across the continent.

[1085] Will Ross 'Lake Chad: Can the vanishing lake be saved?' available in *https://www.bbc.com/news/world-africa-43500314* , accessed on 03 May 2019; Christoph Haushofer 'DRC: Kinshasa says no to water transfer from Ubangi River to Lake Chad' available at *https://www.afrik21.africa/en/drc-kinshasa-says-no-to-water-transfer-from-Ubangi-river-to-lake-chad/* , accessed on 04 May 2019.

[1086] Find information in SADC-ELMS 'Proceedings of the Workshop on the Development of an Integrated Water Resources Management Plan for the Zambezi River Basin' (1996), 2; Merrey et *al.* 'Water Governance Futures in South Asia and Southern Africa: Déjà Vu All Over Again?' In *Freshwater Governance for the 21st Century* (2017) 229, 237; Conley (note 35 above; 17); P. Ashton 'Southern African water conflicts: are they inevitable or preventable?' (2003) 1 (2) *Wat Wheel* 22, 2.

[1087] UNEP (a) (note 35 above; 133).

Concerning the Lake Chad, experts claim that this Lake has lost almost 90 percent of its water resources in less than fifty years and would completely disappear in a couple of decades if no significant action is taken.[1088] Experts further predict that the southern region of Africa will experience a drop of approximately 10 to 30 percent of its rainfall volume due to climate change.[1089] For each of these situations, discussions are pointing towards possible water transfers from the Congo watercourse.

5.6.3 Thinking on the water-climate change nexus across the Congo River basin

There is a pressing need to develop for the Congo River basin an adequate legal and institutional framework for both flood management and control (direct impacts), and water transfer (indirect impacts) as it will be discussed later.[1090] As proposes Matchaya,[1091] water transfers undertaken for market purposes, is a crucial idea, especially for the Congo River basin, because of the financial repercussions of such an enterprise. However, transferring the waters from the Congo watercourse will necessitate further feasibility studies. There are underlying issues concerning the rights that riparian states possess vis-a-vis a shared river's water resources, which riparian's rights Nundwe[1092] called for clarification.

Take, for instance, the case of the Republic of Angola, which is a riparian state to the Congo watercourse as described above.[1093] This country does not have any physical link whatsoever with the Ubangi River or the Sangha River, which are two tributaries to the Congo River, and therefore, parts of the Congo watercourse. The only contact the Republic of Angola could claim to have with these two water bodies could be through its status as a riparian state to the Congo Watercourse, to which both rivers are

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[1088] UNEP (a) *Africa Environment Outlook* (2002), 56.

[1089] *Ibid*. UNEP (a); SARDC *Reporting Water in Southern Africa. A Media Guide to Managing our Water Resources* (2009), 22. Available at *https://www.sardc.net/en/books/reporting-water-in-southern-africa/* , accessed on 19 August 2018.

[1090] Frameworks for flood are developed with ample details in chapters 6 and 7 below.

[1091] Matchaya *et al.* 'An Overview of Water Markets in Southern Africa: An Option for Water Management in Times of Scarcity' (2019) 5 (11) *Water* 1006, 1010.

[1092] C.D. Nundwe *Ownership in Trans-Boundary Water Resources–A Case Study of the Zambezi Watercourse* (unpublished LLM thesis, University of Zambia, 2015), 124.

[1093] Through the Kasai River and some of its transboundary tributaries that cross over the Angolan boundaries and join the DR-Congo, as per the 1997 UNWCC. See section 5.3.2 above.

parts. The question, therefore is: will Angola have any rightful claim vis-a-vis the waters of Ubangi River or the benefits that may result from the Ubangi River, if these waters were to be transferred or exported for remuneration?

In the same order of idea, will the CAR or the Republic of the Congo, which are both riparian countries to the Ubangi River, have any rightful claim vis-a-vis the waters of the Kasai River southwards, if waters from this river had to be transferred into the SADC region for instance? Perhaps, to summarise, how far can the rights of the riparian countries of the Congo River go regarding the waters that are to be considered common to all of them, and the waters that are to be considered common to only part of the riparian?[1094]

The questions above connect with another, which is, at the same time, political and technical: "which riparian state of a transboundary watercourse should be included in a water treaty that only concerns a portion of a shared watercourse?" applied to the Congo River basin, this question becomes "which riparian state of Congo watercourse should be included in a water treaty that only concerns a portion of the Congo watercourse?" This question stands, even if there are ten states across the Congo River basin that have the status of *riparian states* of Congo watercourse,[1095] which in principle applies to the entire Congo watercourse, according to the definition of a watercourse under Article 2 (a) of the 1997 UNWCC.[1096]

Also, as mentioned earlier,[1097] some provisions of the 1997 UNWCC, including Articles 3 (3) and 3 (5), enjoin states to take into consideration the physical characteristics of a shared watercourse and if required sign water treaties accordingly. Articles 3 (3) and 3 (5) of the 1997 UNWCC prescribe:

> "3.Watercourse States may enter into one or more agreements, hereinafter referred to as "watercourse agreements", which apply and adjust the provisions of the present Convention to the characteristics and uses of a particular international watercourse or part thereof. 5. Where a watercourse State considers that adjustment and application of the provisions of the present Convention are required because of

[1094] See slighlty similar questions which were asked in section 5.5 above.

[1095] See section 5.5 above.

[1096] See section 5.5 above. See the wordings of Article 2 (a) of the 1997 UNWCC in section 3.3.1 above.

[1097] See section 5.5 above.

> the characteristics and uses of a particular international watercourse, watercourse States shall consult with a view to negotiating in good faith for the purpose of concluding a watercourse agreement or agreements." [1098]

The complex hydrography and hydrology of the Congo River and its transboundary tributaries lead to the issue of water ownership, which was discussed by Nundwe.[1099] The determination of who has, or who should have certain rights (and duties) on the waters of the Congo River and its tributaries appears crucial for the future because it will contribute to establishing and consolidating states' cooperation across the basin, and avoid suspicions and mistrust.[1100]As argued by Nundwe,[1101] the rights and duties concerning shared water resources should be known and held at the national level of any government that share a common transboundary water resources.

Such an enterprise can be proven vital, especially when the shared watercourse becomes either scarcer or plentiful, as it will be the case across the Congo River basin. Subject to the principles and the rules of international water law, states indeed have sovereign inalienable rights over their water resources. Such inalienable rights are stronger and operational within a state's jurisdiction, meaning its national territory.

In the case of the Congo watercourse, clarification of the rights that the riparian states of the Congo River basin have on the waters of the Congo River seems crucial and may be the determining factor to settle the long-standing disagreements over the shared water resources of the region as mentioned earlier.[1102] As advocates Nundwe,[1103]

> "Negotiations and agreements regarding the sharing of trans-boundary water resources should include aspects of water ownership and the application of the beneficial use principle." [1104]

[1098] Article 3 (3) and 3 (5) of the 1997 UNWCC.

[1099] Nundwe (note 1093 above; 124).

[1100] *Ibid*.

[1101] *Ibid*.

[1102] See section 5.5 above.

[1103] Nundwe (note 1093 above; iv).

[1104] *Ibid*.

There is an inflexible affiliation between a state and the water resources that originate from its national territory. Such a link continues to be felt by such a state or its inhabitants, even after that such waters have crossed over such a state's territory and have become the waters of another riparian state.[1105]

If there be no need to define water ownership in a transboundary context, then the use of such waters should be declared free to all, at least for the sake respecting the international principle of equality of people and nations.[1106] Which would mean that a state would not exclude any other state whether riparian or not, from exercising its right towards the open and free to access water resource. In the case of the Congo River, even the countries whose territory lies outside the Congo River basin would be given free access to the basin's waters.

As far as navigation is concerned, the regime of the 1885 Berlin final Act discussed above illustrated well this thought of this thesis.[1107] The only difference between this thought and the 1885 Berlin Regime is that the Berlin regime declared free navigation to all, whereas the fictitious regime we are discussing here would declare free access to all concerning the non-navigational uses of shared water resources.

However, the above series of questions, and the difficulties they each raised, recalls the debates that took place at the ILC, around the issue of which riparian state to include in the definition of an *international watercourse*. The summary of the views which were expressed to the special rapporteur of the ILC by some states' delegates to the ILC was as follow:

> "To the extent that parts of the waters in one State are not affected by or do not affect uses of waters in another State, they shall not be treated as being included in the international watercourse system. Thus, to the extent that the uses of the waters of the system have an effect on one another, to that extent the system is

[1105] See details in section 2.4.2 above.

[1106] The principle of equality of people and national is enshrined in Article 2 (1) of the charter of the United Nation Organisation, available at *https://treaties.un.org/doc/publication/ctc/uncharter.pdf*, accessed on 21 August 2019.

[1107] See sections 3.4.2 and 3.5.5 above.

international, but only to that extent; accordingly, there is not an absolute, but a relative, international character of the watercourse." [1108]

The important view contained in this section was not given the due consideration it deserved. The view seemingly did not meet the expectations of the ILC special rapporteur, who squarely recommended its abandonment. It was this abandonment that closed the door to in-depth discussions on the view contained in the above section. The outcome of such a discussion could help empty all possible future questions on the international character of some watercourse, as it seems to be the case.[1109] An in-depth analysis of the content of this dropped off section could have perhaps brought more lights around the content that was to be given to the concept of international watercourse under the 1997 UNWCC.

In the case of the Congo River and its transboundary tributaries, the riparian countries will need to develop and consolidate water cooperation through solving or preventing several transboundary water issues, including the ones raised in this section of this thesis. In the context of the Congo River basin, especially, it seems more likely that basin-wide water cooperation will need to consider both the sharing of the resource and, sharing the benefits that may emanate from the resource. As per Article 5 and 6 of the 1997 UNWCC, there is also the duty of sharing across the basin some transboundary water responsibilities, such as the protection of the Congo watercourse and its sustainability.

5.7 Conclusion

Chapter 5 has described the fundamental characteristics of the hydrography of the Congo River basin, from where flows the Congo watercourse. It has also introduced and described the major flows that form the Congo watercourse, namely the Congo River and its major transboundary tributaries, which are the Ubangi, Kasai, Sangha, the Lualaba –Lukuga Rivers, and the Tanganyika Lake. Under Article 3 of the 1997 UNWCC, riparian countries are required to consider the particularities of a transboundary water system while entering into

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[1108] See 'Summaries of the Work of the International Law Commission' available at *http://legal.un.org/ilc/summaries/8_3.shtml* , accessed on 13 June 2019; See Yearbook Of The International Law Commission (1991), 48.

[1109] See section 4.4.5 above.

water agreements. This chapter, therefore, has described the core hydrographical characteristics of the Congo watercourse, since these characteristics will be critical towards the negotiation of a climate proofed-water regime to govern the Congo water system. It has explored the overall hydrology of the Congo River, which receives up to one-third of its waters from transboundary tributaries. The internationality of the Congo River was discussed and confirmed, despite the birth of this river within the territory of the DR-Congo, which it traverses before discharging in the Atlantic Ocean. Nevertheless, this chapter has raised serious issues associated to an open-ended application of such internationality and has shown that there the middle section of the Congo River could be viewed as the starting point of the international section of the Congo River, since it is a boundary forming section, and in addition, most of the transboundary tributaries of the Congo River discharge in that middle section. Concerning the impacts of climate change on the water resources of the basin, this chapter has highlighted the Congo River basin's vulnerability to floods in particular, because of the 11 to 17 percent in water availability increase across the basin. After discussing the hydrography and hydrology of the Congo River and its transboundary tributaries, the next chapter will describe and analyse the legal framework thereof, in order to undertake, in a later stage, its climate change-related assessment.

6 THE LEGAL FRAMEWORK THAT GOVERNS THE CONGO RIVER AND ITS TRANSBOUNDARY TRIBUTARIES

6.1 Introduction

The previous chapter attempted to provide a hydrographic description of the Congo River and its transboundary tributaries. This present chapter will discuss the legal framework thereof. This chapter also aims to identify and describe the existing agreements that apply to the Congo River and its transboundary tributaries before undertaking their assessment concerning the integration of the climate change dimension. In order to reach its objective, this chapter will start with a quick overview of the birth and evolution of the legal regime that governs the Congo River and its transboundary tributaries. The critical historical steps that will be described here will cover the precolonial, colonial, and post-colonial epochs, and lastly, the view of the contemporary form of the regime. In this chapter, a brief account will be given concerning a water conflict that occurred between the DR-Congo and the Republic of the Congo, which occurred in the 1970s, and which is often overlooked by the consulted sources in the account of this thesis. This chapter will, in the end, discuss the hydropolitics around the waters of the Congo River and its transboundary tributaries, and explore from different perspectives the stances of the key riparian states of the Congo River in order to try to acquire a better understanding of the dynamics around the waters of the Congo River. This is because the river basins' hydropolitics are dominant, and are often decisive on the forms and contents of the laws and institutions that govern the transboundary waters.

This chapter is comprised of a threefold section in which the first outlines the historical foundations and evolution of the regime that applies to the Congo River and its transboundary tributaries, the second describes the current legal regime that applies to the Congo watercourse, and lastly, the third briefly discusses the hydropolitics at play around the Congo River and its transboundary tributaries.

6.2 Historical evolution of the regime of the Congo River and its tributaries

6.2.1 The pre-colonial period

6.2.1.1 Overviewing some relevant factors during the pre-colonial era

The emergence of a legal framework to govern the Congo River and its transboundary tributaries finds its historical origin shortly before the beginning of the colonial era.[1110] An initial special regime was put in place to govern the Congo water system because of the recognition of the strategic importance of this waterway for the European explorers in general, and Leopold II, the King of Belgium more specifically.[1111] This initial regime was the work of the colonisers, who tacitly applied to the Congo watercourse the regime of the 1815 Vienna Treaty.[1112] The application of the 1815 Vienna Treaty was concerned exclusively with the European explorers who navigated on the Congo Waterway.[1113]

The legal regime that governs the waters of the Congo River would be developed progressively in the nineteenth century and stayed in power until the epoch of African independence in the twentieth century. That initial legal framework was focused on navigation, just like the rest of the other frameworks that governed the international water law at that time.[1114] The extension of the regime to the non-navigational uses would occur in a later stage as it will be discussed.

After the independence of the states of the basin, which occurred mostly in the 1960s, the managerial approaches in the field of transboundary water resources, which the post-colonial governments begun to take, had, in general, nothing to do with the colonial approaches. Also, issues such as the determination of state boundaries, the freedom of navigation along the international waterways, and the continuation of transboundary water projects inherited from colonial regimes all challenged significantly the new African states, as they sought to develop regional and river basins cooperation.

[1110] See section 6.2.2. below.

[1111] *Ibid.*

[1112] See section 3.4.2 above.

[1113] The Treaty application also concerned other nationalities such as the North American in exploration in the region, as long as they were not natives of Africa, in exploration in the region. See section 3.4.2 above.

[1114] See section 3.5.3 above.

Environmental issues emerged recently, including the necessity to ensure the sustainable protection of shared water resources, through taking into account the integrated management of water resources, and the impact of climate change on freshwater resources.[1115] The environmental issues that are mentioned above touched the sustainability and protection of water resources and significantly contributed to the development and shaping of the current legal regime that applies to the Congo watercourse.

Discussions regarding the regime that governs the Congo River and its transboundary tributaries would begin with the Treaty of Vienna of 1815, which was tacitly applied on the river.[1116] Following the 1815 Vienna Treaty would be the 1885 Berlin Final Act, which in turn, would be followed by the 1919 Convention of Saint-Germain-en-Laye. The discussions follow with the Convention of 1999 which instituted a uniform regime of navigation on the Congo River and instituted the International Commission for the Congo, Oubangui and Sangha Rivers. Discussions would conclude with the 2007 addendum to the 1999 CICOS Agreement establishing the uniform regime of navigation on the Congo River and its tributaries.[1117]

The analysis and the assessments will be conducted with the view of identifying the treaty characteristics that contribute to the responsiveness of the regime that governs the Congo River to the predicted impacts of climate change. As indicated earlier,[1118] the regime that will be analysed will only include the treaties signed over the western section of the Congo water system, which include the Kasai, the Ubangi, and the Sangha Rivers plus northern and western sections of the Congo River itself.[1119] Nevertheless, reference may be made during the discussion to the system formed by the Lake Tanganyika, the Lukuga and Lualaba Rivers, for hydrographic purposes.

[1115] See section 1.1 above.

[1116] See section 3.4.2 above.

[1117] See section 6.3.2 below.

[1118] See section 1.7 above.

[1119] See section 5.4. above.

6.2.1.2 The regime of the General Treaty of Vienna, of 1815

It was by necessity that the 1815 Vienna Final Act was tacitly imported and applied to the Congo watercourse.[1120] Since the discovery of the mouth of the Congo River in 1482 and its progressive opening to international trade, the number of Europeans who visited the region grew steadily and became significant in the nineteenth and twentieth century.[1121] Europeans passing by the Congo River were motivated either by colonial motives or by businesses because the Congo region offered promising perspectives in terms of international trade.[1122]

There was a wealth of raw materials across the region, of which some were crucial to support the European Industry. Therefore, to avoid any anarchy across the basin, the non-native users of the Congo River, which were European in most of the cases, decided to import and apply on the Congo watercourse the same regime of international rivers that was in power in Europe. The said regime was the one instituted under the 1815 Vienna Final Treaty.[1123]

Undoubtedly, the ultimate goal that was sought by those who imported the European regime to the Congo River was nothing other than to facilitate the circulation of the European and their goods through the River basin.[1124]

Articles CVIII and CIX of the 1815 Vienna Treaty provide:

> "(CVIII) The Powers whose states are separated or crossed by the same navigable river, engage in regulating, by common consent, all that regards its navigation… (CIX) The navigation of the rivers, along their whole course, referred to in the preceding article, from the point where each of them becomes navigable, to its mouth, shall be entirely free, and shall not, in respect to commerce, be prohibited

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[1120] See section 3.4.2 above; The 1815 General Treaty of Vienna. Available at *http://www.hlrn.org/img/documents/final_congress_viennageneral_treaty1815.pdf* , accessed on 18 June 2019.

[1121] Devroey & Campenhout (note 956 above; 52-72).

[1122] *Ibid*.

[1123] See section 3.4.2 above.

[1124] K.C. Ngoma 'Le Régime Juridique de navigation dans le Bassin bu fleuve Congo: Entre centralisation, application et Rejet d'un Cadre Conventionnel Régional mal négocié en République Démocratique Du Congo (2015) 2 (1) *KAS Af L Stu Lib* 350, 350.

> to anyone; it being understood that the regulations established with regard to the police of this navigation, shall be respected; as they will be framed alike for all, and as favourable as possible to the commerce of all nations." [1125]

The above provisions of the 1815 Vienna Final Act, instituted a regime of freedom of navigation and trade for all potential users of the rivers that the treaty targeted.

The tacit extension of the 1815 Vienna's regime on the Congo watercourse had the same effect on the users of the Congo as on the users of the European rivers in Europe, until the advent of a regime that was conceived specially for the Congo watercourse, which was the Berlin Final Act of 1885, which is discussed further.[1126] The 1815 Vienna regime was to be observed "along the whole course of the river", meaning the main water body of the River plus all the navigable sections of its tributaries. It was thanks to this freedom of navigation that trade activities and commercial exchanges between Europe and the Congo region intensified to the extent that the Europeans became obliged to institute a special regime for the Congo River and its tributaries.[1127]

There are generally two other reasons that can explain the above importation of the 1815 Vienna Treaty regime: *firstly*, neither the kingdoms nor the empires which were present in the Congo River basin had modern legal systems in place, which could be applied to the European sailing in the region. Even if they did have such a legal system in place, its application to the European explorers would have been tricky.

In order to avoid any situation that could become uncontrollable between the growing size of European traders and explorers in the region, the Europeans opted for the importation of a regime which they were already familiar with, as they applied it and complied to it back in Europe.[1128] As argues Yakemtchouk,[1129] such a trade-off by the colonial powers was understandable because of the overall climate of competition that characterised the

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[1125] Articles CVIII and CIX 1815 General Treaty of Vienna.

[1126] See section 6.2.2.1. below.

[1127] Ngoma (note 1125 above; 350).

[1128] Event in repressive matters, the European regime was also observed. All severe civil or criminal complaints which occurred on the waters of the Congo River, which of the responsibilities of the European Citizens were brought before the European judicial instances, which were operating in Europe.

[1129] Yakemtchouk (note 475 above; 482).

"scramble for Africa". Was it not for such a timely regime extension, it could not be surprising to see a European state privatising a defined river or portion of a river in Africa while subjecting the other European states to a regime of taxes for the use of thereof.

The second reason is associated with the fact that from a colonial perspective, some areas in the regions were already under European control. The extension of the European territories in Africa implied that the legal frameworks that applied to the metropolis, in Europe, were applied as well on the European territories of Africa.[1130] Areas such as the Congo watercourse, which were under the control of the colonial powers, were generally considered the extensions of the European countries.[1131]

Although the regime of the 1815 Vienna Final Act applied to the waters of the Congo River and its tributaries, it will not be beneficial to this thesis because of its exclusive focus on navigation. However, the 1815 Vienna Final Act paved the way to the internationalisation of the Congo watercourse, as discussed above.[1132] Several European nationalities continued using the Congo waterway without a specific law that regulates their activities in that part of the world until the advent of the 1885 Berlin Final Act.[1133]

6.2.2 The colonial period

6.2.2.1 The Regime of the Final Act of Berlin of 1885[1134]

The first piece of law to expressly govern the Congo River and its tributaries was doubtlessly the 1885 Berlin Final Act, which was adopted to put an end to the legal vacuum that prevailed in the navigation sector and opened the way to the tacit application of the 1815 Vienna Treaty as explained above. The 1885 Berlin Final Act was adopted by the canonised "Berlin conference for west Africa" of 1885, sometimes referred to as the "Congo Conference". Sir Otto von Bismarck, the first Chancellor of the Germans,

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[1130] Keith (note 1047 above; 42-56).

[1131] *Ibid*.

[1132] See section 1.5 above.

[1133] Keith (note 1047 above; 42-56).

[1134] Full text of the 1885 Final Act of Berlin available at *https://loveman.sdsu.edu/docs/1885GeneralActBerlinConference.pdf* , accessed on 14 May 2019.

convened the conference, which lasted from November 15, 1884, to February 26, 1885, in Berlin, Germany.[1135]

The official objective of the conference was to harmonise the views of the western countries on the process of African colonisation and thus avoid the outbreak of open conflicts between opposing colonial appetites.[1136] The outcome of the conference was the adoption of the "Berlin Final Act of 1885", a treaty of 38 Articles, which officially extended the observance of the principle of freedom of navigation on the Congo River and the Niger River.

The provision below testifies that the 1885 Berlin Final Act followed the footsteps of the 1815 Vienna Final Act regime. It consecrated three fundamental principles: *i)* the freedom of navigation for all, *ii)* the freedom of commerce for all, and *iii)* the principle of neutrality.[1137] As already mentioned, the first two principles were an extension of the regime of the 1815 Vienna Convention and the 1856 Treaty of Paris to the Congo and the Niger Rivers,[1138] as expressly mentioned in the preamble of the 1885 Berlin, in its points 4 and 5:

> "The plenipotentiaries… Who, being provided with full powers, which have been found in good and due form, have successively discussed and adopted… 4. An Act of Navigation for the Congo, which, while having regard to local circumstances, extends to this river, its affluents, and the waters in its system, the general principles enunciated in Articles 58 and 66 of the Final Act of the Congress of Vienna, and intended to regulate, as between the Signatory Powers of that Act, the free navigation of the waterways separating or traversing several States - these said principles having since then been applied by agreement to certain rivers of Europe

[1135] Representatives from 14 countries attended the Berlin conference, from November 15, 1884 to February 26, 1885. The attending countries included: France, Belgium, Austria-Hungary, Portugal, Denmark, Germany, Italy, the Netherlands, Great Britain, Russia, Sweden-Norway (unified from 1814 to 1905), Turkey, Spain, and the USA. France, Great Britain, Germany, and Portugal were the major actors during the conference, as at that time, they controlled most of the African colonial spaces. For general accounts on the Berlin Conference, see: Keith (note 1047 above); see also Brunschwig (note 950, 609-610).

[1136] M. Craven 'Between law and history: the Berlin Conference of 1884-1885 and the logic of free trade' (2015) 1 (3) *Lon Rev of Int L* 31, 32.

[1137] Keith (note 1047 above).

[1138] Sections 4 and 5 of the preamble of the 1885 Berlin Act made reference to the link between its regime and the regime already instituted under the 1815 Vienna Convention.

and America, but especially to the Danube, with the modifications stipulated by the Treaties of Paris (1856), of Berlin (1878), and of London (1871 and 1883)."[1139]

The Berlin treaty further introduced the concept of "the dependencies of the waterways", which was a legal innovation at the time and was applied to the Congo basin.[1140] For Courcel,[1141] one of the efforts colonial powers deployed at the Berlin conference was to give to its treaty extensive radiation, with doctrinal significance, and which could last and influence the law of international water resources. The portion of the declaration of principle at the introduction of the 1885 Berlin Final Act which state that "These provisions are recognised by the signatory powers as forming henceforth a part of international public law",[1142] was an expression of this vision of extensive radiation.

The regime of the 1885 Berlin Final Act later became a custom right in the Congo River basin and in some other river basins on the continent, before its denunciation at the post-independence period. Many scholars are of the view that the 1885 Berlin Final Act made a significant contribution to the international water law because it laid a foundation for both the regime of navigation and the regime of the non-navigational uses of international watercourses in general.[1143] There is no doubt that the context of the epoch preferred the navigation to be in the heart of the negotiations in international affairs. That

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[1139] Text of the 1885 Final Act of Berlin, available at *https://www.thoughtco.com/general-act-of-the-berlin-conference-4070667* , accessed on 13 April 2019.

[1140] Article 16 of the 1885 Final Act of Berlin provides : "The roads, railways or lateral canals which may be constructed with the special object of obviating the unavailability or correcting the imperfection of the river route on certain sections of the course of the Congo, its affluent, and other waterways placed under a similar system, as laid down in Article 15, shall be considered in their quality of means of communication as dependencies of this river, and as equally open to the traffic of all nations." At this epoch, large rivers were the only or main access route to the interior of the continent, therefore, a regime that made it easy to all the nations exploring Africa to penetrate its interior regions was badly needed. However, the Congo watercourse was not the only waterway on which applied this freedom regime. The principle is also proclaimed by the Convention of Constantinople, of October 29, 1888, which consecrated the freedom of navigation in the Suez Canal, Egypt. A Similar regime extension happened earlier, in 1856, and later in 1888; Caponera (b) (note 313 above; 5); Kamto (note 466 above; 846).

[1141] G.D. Courcel *L'influence de la Conférence de Berlin de 1885 sur le droit colonial international* (1935), 2002.

[1142] See Article 26 of the 1885 General Act of Berlin.

[1143] Caponera & Nanni (c) (note 147 above; 273); M. Craven (note 1137 above; 32-33); A. Anghie *Imperialism, Sovereignty and the Making of International Law* (2004), 90-97.

is also how the principle of freedom of navigation became the central issue of the 1885 Berlin Final Act.

It seems to be a correct timing to raise some important points here, concerning the early declaration of the internationality of the Congo River and its tributaries. *Firstly*, the institution of a regime of internationality over the Congo River and its navigable tributaries was motivated by colonial determinants and trade forces rather than being the fact of the hydro-morphology of the river. *Secondly*, such an internationalisation was decided not based on some African determinants, but solely and mainly on the interests of the colonial powers. The internationalisation of the Congo River and its tributaries was politically motivated. It was done with the view of forming a buffer state in Central Africa, to support the colonial programs and trades across the Congo region.[1144] After the independence of the African states, some of the new African governments, including the governments of the states of the Congo River basin, inherited several transboundary river problems, which caused a significant impact on states' stability across the region. Some of these issues are persistent up to the present time.

To emphasize on the negative character of applying an extraneous solution to a foreign hydrographic basin Yakemtchouk[1145] recalls that the geophysics of states had such peculiarities to the extent that principles which are applied in the case of one state or one river basin would sometimes prove to be quite futile or even harmful if applied as such to another. The regime of the 1997 UNWCC has followed suit to this approach. Article 3 of the 1997 UNWCC recommends that riparian states take into consideration the particular characteristics of watercourses and river basins before signing water treaties.[1146] The extension of a European solution on an altogether different context and hydrography was not without consequences in terms of the stability for the Congo River basin after state independences across the basin.

In the meantime, the 1885 Berlin Final Act settled the partition of Africa and delimited the French and the Belgian spheres of influence across the Congo River basin. France occupied the French Equatorial Africa (AEF), which was situated on the right bank

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[1144] Yakemtchouk (note 475 above; 481).

[1145] *Ibid*.

[1146] Article 3 of the 1997 UNWCC. See details on the 1997 UNWCC in section 4.4 above.

of the Congo and the Ubangi Rivers. These two territories have respectively become the present Republic of the Congo and the Central African Republic. The Belgian occupied the Congo Free State on the left bank of the Congo and Ubangi Rivers. The Congo Free State was privately owned by Leopold II, the King of the Belgians, who handed it over to Belgium in 1908.[1147] What seems politically relevant to mention is that even if the states of the Congo River basin depended on various colonial powers at that time, the supervision of the international regime of the Congo River was entrusted to King Leopold II, thus proving an earlier recognition of the leading role of the Belgian Congo within the shared basin.[1148]

Similar to the 1815 Vienna Treaty, the 1885 General Act of Berlin will not be of great use to this research, apart from the significant role it played in the development of the international watercourses law.[1149]

6.2.2.2 The Regime of the Convention of Saint-Germain-en-Laye of 1919

The evolution of international relations after World War I dictated a change in several things, including the general application of the principle of freedom of navigation, whether in Europe or Africa. Also, keeping the 1885 Berlin regime running for the Belgian Congo became unbearable at some point because of the increasing expenses that the regime represented for the country. The signatory parties of the 1885 General Act of Berlin, therefore, decided to meet once more in 1919 and to amend the 1885 Berlin Final Act, which they replaced with the Convention of Saint-Germain-en-Laye of 1919.[1150] The

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[1147] Right and left sides of the Congo River are referentially referred to by an observer who is respectively situated at Kinshasa, DR-Congo and Brazzaville, Republic of the Congo, and whose face is turned towards the source of the Congo River. On his left hand is the Republic of the Congo (the French territories), while on his right hand will be the DR-Congo (the Belgian territories).

[1148] Keith (note 1047 above; 57-65).

[1149] The significante role played by the 1885 Berlin regime in international law was however contested by scholars such as Sybil Crowe, for whom the Berlin conference was if anything, a failure. See Crow's opinion in S. Crowe *The Berlin West African Conference 1884-1885* (1942).

[1150] In fact, World War I demonstrated the ineffectiveness of the 1885 Berlin Act in certain areas, such as in the observance of the freedom of navigation during wartime. Also, some provisions of the General Act of Berlin had fallen into disuse, whereas others simply lapsed. From Article 17 to Article 24, provisions concerning the establishment of an International Commission fallen into disuse, whereas the provisions of Articles 34 and 35 concerning the rules to be observed in the event of the occupation of new territories on

general view of the signatory powers was to adopt a new regime that would reflect their desire: "To ensure, by means appropriate to modern requirements, the application of the general principles of civilisation as enshrined in the Berlin and Brussels Acts."[1151]

The Convention of Saint-Germain-en-Laye of 1919 took place at the Château de Saint-Germain-en-Laye. The meeting was a gathering of the victorious allies of World War I on one side and the Republic of German-Austria on the other side.[1152] At the end of the conference, on September 10, 1919, the Convention of Saint-Germain-en-Laye would be signed to replace the 1885 Berlin Final Act. The 1919 Saint-Germain Convention maintained the regime of freedom of navigation, trade, and the principle of equal treatment of the users of the Congo watercourse.

If it is evident that the 1919 Saint-Germain Convention repealed the 1885 Berlin Final Act, it is nonetheless true that only the states that did not adhere to the 1919 Saint-Germain Convention were concerned.[1153] Seven states in total ratified the 1919 Saint-Germain Convention, whereas the others did not give the convention any significant attention.[1154] History recalls that the interpretation of the Saint-Germain-en-Laye Convention was problematic, and for that reason, the ambition of the treaty to be a universal convention could not be achieved.[1155]

When African countries acceded to independence, some repealed the 1919 Saint-Germain-en-Laye Convention, others denounced it, whereas some others did not take

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the African coast simply lapsed. Therefore, a complete revision, or a repeal of the 1885 Berlin General Act was required. Further toughts on the legacy of the 1885 Conference in: M. Ewans *European Atrocity, African Catastrophe: Leopold II, the Congo Free State and its Aftermath* (2017); T. Pakenham *The Scramble for Africa: 1876-1912* (1991); S. Fo¨rster *et al. Europe and Africa: The Berlin Africa Conference 1884-1885 and the Onset of Partition* (1988).

[1151] *Ibid*. Ewans *Ibid*. Pakenham *Ibid*. Fo¨rster.

[1152] *Ibid*.

[1153] *Ibid*.

[1154] The signing states included USA, Brithish Empire, Italy, Japan, on the one side, and Belgium, China, Cuba, Nicaragua, Greece, Panama, Poland, Portugal, Roumania, Serbia-crat-slovene state, Siam, Czecho-Slovakia. Information available at *http://www.forost.ungarisches-institut.de/pdf/19190910-1.pdf* , accessed on 12 July 2019.

[1155] McCaffrey (a) (note 145 above; 176-179).

any clear, definite position, including some countries in the Congo River basin. As for the DR-Congo, the fact that Belgium was a signatory of the 1919 Saint-Germain Convention implied that its regime applied in the part of the Congo River basin that was under Belgian administration.[1156] Similar to its two predecessors, the regime that was put in place by the 1919 Saint-Germain Convention did not take into account the non-navigational uses of the Congo watercourse, and will, therefore, be of little significance to this thesis.

6.2.2.3 The Regimes of the 1921 Barcelona Convention and the 1923 Geneva Convention

A very brief mention will be made of the Convention and the Statute on the Regime of Navigable Waterways of international interest signed on April 20, 1921, in Barcelona, Spain, and the Convention relating to the development of hydraulic power for several States and the Signing Protocol, which was signed in December 9, 1923, in Geneva, Switzerland.[1157] These two instruments are part of a group of multilateral agreements that were negotiated and adopted under the dissolved Society of Nations.[1158] Although from a practical viewpoint both conventions had limited impact on regulating the transboundary water resources, they have somewhat contributed (especially the Geneva Convention) to the advent of a new era in the field of international water law by regulating a non-navigational use of international waterways.[1159]

Very few agreements were concluded between the riparian states of the Congo River basin. Agreements that were signed related either to the maintenance of waterways or to hydroelectricity production on certain frontier rivers. As for regulating the

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[1156] See further precisions in note 1120 above.

[1157] *https://www.internationalwaterlaw.org/documents/intldocs/hydraulic_power_conv.html* , accessed on 12 May 2019.

[1158] The League of Nations was an international organisation which preceded the United Nations Organisation. It existed from 1919 until 1946, and was founded after the Peace Conference held in Paris in 1919. The overall goal of the League was to avoid the repetition of another devastating war, after World War 1. More information on the League of Nations available at *https://treaties.un.org/Pages/LONOnline.aspx?clang=_fr* , accessed on 12 May 2019.

[1159] Many scholars have raised the fact that the 1923 Geneva Convention did not secure a significant number of states' ratification, neither was it signed and adhered to by states that were concerned by the problematic the convention dealt with, therefore, for these authors, the convention only had little legal relevance and was usefulness; See for instance Berber (note 636 above); Kamto (note 466 above; 850).

non-navigational uses of the waters of the Congo River and its transboundary tributaries, there was no significant advancement.

6.2.3 The post-Independence period

6.2.3.1 The early independence days and the legal vacuum in the sector

Most of the riparian states of the Congo River gained political independence in 1960.[1160] The state's political independence implied the abrogation of any incompatible colonial regime. New African states had, therefore, the liberty to either continue to apply or to denounce the colonial regime over transboundary waters, but as says Kamto,[1161] state accessions to independence were generally followed by the repeal of the colonial regime. In practice, the repeal of the colonial regime by the new states occurred in various and somewhat confusing ways. While some States chose to implicitly reject the colonial regimes by substituting them with different regimes, a few others proceeded differently.[1162]

From a theoretical viewpoint, two opposing doctrines are generally considered concerning states' succession: The *universal succession* doctrine also referred to as the *doctrine of continuity* and the *clean slate* doctrine.[1163] The *universal succession* doctrine provides that the rights and obligations of a predecessor State that are attached to the territory in transfer are passed on to the Successor State. Whereas the "clean slate" doctrine, by contrast, provides that the Successor State substitutes its sovereignty over the transferred territory and replace that of the predecessor State.[1164]

While the continuation or denunciation of the colonial regimes could be stress-free to envisage in a domestic context, things tended to be different in transboundary

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[1160] Independence days: the DR-Congo: 30 June 1960; Rep. of the Congo: 15 August 1960; Cameroon: 1 January 1960; CAR: 13 August 1960; Rep of Angola: 11 Nov. 1975.

[1161] Kamto (note 466 above; 847).

[1162] The country parties to the Convention on the Navigation and Economic Cooperation between the States of the Niger Basin of February, 18 1963, adopted an open attitude of treaty denunciation. This was particularly the case with the regime resulting from the disputes over the East African lakes. See Kamto (note 466 above; 847).

[1163] See for more details on states succession in international law D.P. O'Connell, *The Law of State Succession* vol. 5 (2015), 6-9; C. Emanuelli 'State Succession, Then and New, with Special Reference to the Louisiana Purchase (1803)' (2002) 63 *La. L. Rev,* 1277.

[1164] *Ibid*. O'Connell; *Ibid*. Emanuelli.

settings. In the Congo River basin, states adopted, in general, an ambiguous position vis-à-vis the colonial regime. The core texts which states were in concern with are the 1919 Saint-Germain-en-Laye Convention and the 1921 Barcelona Convention; yet, the DR-Congo gave no fixed position on the matter and which fuelled the rumours that the country opted for a continuation of the colonial regime.[1165]

Those rumours almost turned into conviction in the public opinion because of Article 6 of the transitional Constitution of the DR-Congo, which was adopted on June 25, 1967, and provided that treaties concluded before June 30, 1960 (the DR-Congolese independence day) would remain valid only insofar as the legislator did not amend them.[1166] Besides, Patrice Lumumba, the first Prime Minister of the DR-Congo, declared to the Senate of the state, on June 30, 1960, that the treaties, conventions, and protocols that were adopted by Belgium on behalf of the Congo had to be thoroughly examined by the new Congolese government for continuation, or denunciation.[1167] The analysis of these two facts suggested in a more significant part a survival of the colonial regime in the DR-Congo.

However, while observers still thought that the country had perpetuated the colonial regime, following the above declarations from its government, the DR-Congo would surprise many observers by multiplying state acts of inconsistency concerning its succession to the colonial regime. On March 14, 1966, for instance, the country unilaterally adopted a "Code of navigation in internal rivers and lakes" as the state's new piece of domestic law in order to regulate the navigation on the Congo River and the lakes that are situated within the DR-Congo.[1168] No reference was made to the international status of the Congo River. On the contrary, the new piece of law treated the Congo River as a domestic flow. For Mubiala,[1169] this new piece of law became a clear indication of the abandonment of the colonial regime by the country. Nonetheless, the public had to wait until November

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[1165] Mubiala (note 57 above; 77-87).

[1166] *Ibid*.

[1167] Yakemtchouk (note 475 above; 493) ; Deep analysis of the pre-independence treaties will never be done because of the political instabilities and civil wars that settled in the country shortly after that statement.

[1168] Available at *https://www.droitcongolais.info/files/7.21.-Ordonnance-du-14-mars-1966_Code-de-navigation-fluviale-et-lacustre.pdf*, accessed on 02 June 2019.

[1169] Mubiala (note 57 above; 82-112).

2, 1971, when the DR-Congo representative at the UN Sixth Committee would formally denounce the 1885 Berlin Final Act.[1170]

Unlike the ambiguous position that was adopted by the DR-Congo, some other states of the basin, including the Republic of the Congo and the Central African Republic, considered the regime of the 1919 Saint-Germain-en-Laye Convention to still be in place, and as the unique regulatory framework for the Congo River and its tributaries.[1171] These two countries would later denounce the 1919 Saint-Germain-en-Laye Convention, on the occasion of the adoption of the statutes of the Equatorial Customs Union.[1172]

In the absence of States' consensus on which regime to apply, the regime gap that settled entertained in the long run a confusion on the international character of the Congo River and its tributaries. As for the colonial regime, it can be understood that despite the initial ambiguity observed in the position of some states of the basin, the general attitude across the basin leaned more towards a regime denunciation.[1173]

The Niger is the other watercourse that was targeted by the 1885 Berlin Final Act. The position the riparian states of the Niger took was a contrast to that of the Congo basin's states. The riparian countries of the Niger River were clear from the start with regard to abandoning the colonial regime.[1174] In a declaration dated February 16, 1963, the states of the Niger basin considered that the anterior status of the Niger River as per the 1919 Saint-Germain-en-Laye Convention was incompatible with the post-independence interests

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[1170] *Ibid*.

[1171] T. Maluwa (b) 'Succession to Treaties and International Fluvial Law in Africa: The Nigerian Regime' (1986) 3 (33) *NIIR* 334, 366.

[1172] The Equatorial Customs Union (ECU) was an organisation that was established on June 23, 1959, by the Conference of Heads of the States of the Equatorial Africa, namely Cameroon, Central African Republic, Chad, Congo, and Gabon. The aim of the organisation was the integration of the Customs authorities and policies of the participating countries. ECU.was replaced with the Central African Customs and Economic Union (CACEU), on December 1964; See for further details: *https://uia.org/s/or/en/1100022930* , accessed on 12 June 2019.

[1173] Mubiala (note 57 above; 82-112); J. Bukasa *Le régime international du fleuve Congo* (Unpublished PhD thesis, University of Paris I, 1972), 310.

[1174] *Ibid*. Bukasa.

of the new States in the region.[1175] These states thus made it clear from the start by avoiding any confusion regarding their intentions vis-à-vis the colonial regime over their shared watercourse. At the time of the drafting of this thesis, the legal framework of the Niger watercourse, the level and quality of cooperation among its riparian states around the basin's shared water resource has been able to evolve, in comparison to the legal framework in place in the Congo River basin.

The post-independence legal and political context of most of the states of the Congo basin were generally delicate. Most of these states seemed unprepared regarding the legal aspects that are associated with transboundary water resources.[1176] In addition to the political instabilities that followed the independence of the two Congos, their opposing views regarding the internationality of the Congo River contributed significantly in creating the legal vacuum in the governance of the transboundary water resources of the basin.[1177] The opposing views regarding the internationality of the Congo River between these two countries happened partly because of significant misunderstandings on each side concerning the laws and principles of transboundary water resources that applied at that time.

In 1971, the opposing views of both countries grew to the extent that they almost went to war because of a disagreement over the international status of the Congo River.[1178] It is for two reasons that this interstate water conflict will be briefly discussed below. *Firstly*, the conflict has helped display the conception which both countries held

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[1175] By gaining international sovereignty, the former African colonies realised that states independence did not worth much without economic independence. The new African states took advantage of their majority in the UN General Assembly to develop a normative action that would impose the principle of permanent sovereignty over natural resources. This principle was much of a reaffirmation of the sovereignty of States in the economic field. It is mentioned in several United Nations Resolutions, in particular Resolution 1 803 (XVII) adopted by the Assembly in 1962 entitled "Permanent sovereignty over natural resources"; Resolution 3 201 (SVI) of 1 May 1974 on the "Declaration on the Establishment of a New International Economic Order", and Resolution 3281 (XXIX) of 14 December 1974 on the "Charter of Economic Rights and Duties of the States". And Article 2 (1) Resolution 3281 (XXIX) of 14 December 1974 states: Each State freely holds and exercises full and permanent sovereignty over all its wealth, natural resources and economic activities, including possession and the right to use and dispose of them. See for details Mubiala (note 57 above; 77-87).

[1176] Maluwa (b) (note 1172 above; 366).

[1177] Mubiala (note 57 above; 77-87).

[1178] See section 6.2.4 below.

over the Congo River after they accessed independence. The same conceptions seem to have not much evolved ever since: the DR-Congo considers the Congo River as a domestic river, whereas the Republic of the Congo claims its internationality.[1179] S*econdly*, the conflict gives a clue on the reason why the riparian states of the Congo watercourse have never succeeded putting around the Congo River a water cooperation program that works, in contrary for instance to the riparian states of Senegal or Niger Rivers, which, as already said appear to be well advanced in water cooperation.[1180]

6.2.3.2 Interim regimes under partial ephemeral treaties on the Congo River

In the absence of a definite post-independence regime as explained above, the states of the basin resorted to the practice of bilateral conventions in the period between independence and the 1990s. Only a few examples of these will be given here, because most of these agreements kept the same focus on navigation, and are therefore of less interest to this thesis. Some of these agreements nevertheless included new issues among which were interstate cooperation, the development or maintenance of some sections of the Congo watercourse and the regulation of the use of the rivers that form natural boundaries between the signatory states.[1181] These navigation-centred regimes had only limited application to the non-navigational uses of the transboundary watercourse.[1182]

The DR-Congo, the Republic of the Congo, and the CAR decided in 1978, to overcome some of the tensions between them and set in place a tripartite commission that would be tasked with the development of the River basin. After its establishment, the tripartite commission requested the support of the United Nations Economic Commission for Africa (UNECA) to conduct a global study on the possibilities of developing the entire

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[1179] See position of each of these countries in section 6.4 below.

[1180] The Niger River basin was the second River basin to be regulated by the 1885 Berlin Final Act and its subsequent instruments. See "The plenipotentiaries … who, being provided with full powers, which have been found in good and due form, have successively discussed and adopted…" " Article 5. An Act of Navigation for the Niger, which, while likewise having regard to local circumstances, extends to this river and its affluents the same principles as set forth in Articles 58 and 66 of the Final Act of the Congress of Vienna." See Article 5 of the 1885 Berlin Final Act.

[1181] Mubiala (note 57 above; 77-87).

[1182] Medinilla (note 951 above; 6).

Congo River basin and study its international status.[1183] The UNECA held several intergovernmental consultation processes aiming at developing a standard fluvial regime under the auspices of the United Nations.[1184] The work of the Commission benefited from the involvement of major international and regional institutions such as the Central African customs and economic union (UDEAC),[1185] the Economic Community of Central African States (ECCAS),[1186] and various other technical bodies, including the UNDP. With support from the above-mentioned institutions, the tripartite commission drafted four technical agreements that never materialised because of the inaction of the three establishing states.[1187]

In the same order of idea, the DR-Congo and the Republic of Angola signed an agreement on October 25, 1978, for the lower section of the Congo River that defines the boundary of both countries.[1188] In Article 5 of that agreement, the Republic of Angola

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[1183] The United Nations Economic Commission for Africa [Hereinafter UNECA] is a United Nations agency which established in 1958 by the Economic and Social Council of the United Nations (UN ECOSOC) as one of the UN's five regional commissions. Its madate is to promote the economic development of its member States. For more details on the UNECA see *https://www.uneca.org/* , accessed on 15 July 2019.

[1184] Medinilla (note 951 above; 7).

[1185] "Union Douaniere et Economique de l'Afrique Centrale" [hereinafter UDEAC] (or the Central African customs and economic union (UDEAC) was a regional organisation, instituted in 1964 by Cameroon, Gabon, the Central African Republic (CAR), Chad and the Republic of Congo, and became operational in 1966. The main purpose of the UDEAC was to encourage and facilitate trade among its members. Details available at *http://www.cemac.int/Histoire* , accessed on 15 July 2019. In 1994, the UDEAC's member States initiated a comprehensive reform process, which led to the signing of the Treaty of Ndjamena instituting the CEMAC, in 1999, in replacement of the UDEAC. The CEMAC's main objectives is to converge and monitor the progressively creation of a single market between its member states. Details in: *http://www.cemac.int/Histoire* , accessed on 15 July 2019.

[1186] The Economic Community of Central African States [hereinafter ECCAS] is a regional organisation for the Economic integration of states in the Central Region of Africa. It was created in October, 1983 and has currently 11 Member States, which are Angola, Burundi, Cameroon, CAR, Congo, Gabon, Equatorial Guinea, DR Congo, Rwanda, Sao Tome & Principe and Chad. The mission of the ECCAS is " to promote and strengthen a harmonious cooperation and a balanced and self-sustaining development in the fields of economic and social activity." More detailsavailable at *http://www.ceeac-eccas.org/index.php/fr/* accessed on 15 July 2019.

[1187] Ngoma (note 1125 above; 350-382); C. Pilarski *La gestion partagée des ressources en eau dans le bassin du Congo : état des lieux et perspectives* (Unpublished thesis, Laval University, 2010), 66.

[1188] *Ibid*. Ngoma; *Ibid*. *Pilarski*; Most of the treaties in force between the riparian states of the Zaire basin belong to this category.

recognised that the DR-Congo had free access to its territorial waters, islands, islets, and embankments for triangulation purposes, levelling, surveying liquid and solid flow measurement, and for the maintenance of Congolese installations. The agreement also included issues related to the various navigation signs on the targeted section of the river.

In Article 6, the agreement provided for the creation of an intergovernmental institution called the "Commission on the Conditions of Reliability of the Waterfront", to function as a framework for consultation and exchange of hydrographic information for the improvement of airworthiness conditions on the shared watercourse.[1189] The purpose of this institutional body was "to encourage co-operation between bodies that are specialised in the field of planning, developing, and maintaining of the waterways of the two States that concluded the treaty".[1190]

As described in the previous chapter, the Congo River is generally divided into three sections, which are its lower, middle, and upper sections. The middle section of the Congo River concerns primarily three countries: the DR-Congo, the Republic of the Congo, and the Central African Republic. An agreement was signed between the three countries interested in the middle section of the Congo River, in 1978, concerning the creation of a tripartite commission in charge of the development of the middle section of the Congo River; this convention would never enter into force since the DR-Congo would not ratify it.[1191]

A further example comes from the agreement that was concluded between the CAR and the DR-Congo, in 1986, which provided for the joint exploitation of the hydraulic power of the Ubangi River at Mobayi-Mbongo, in the DR-Congo.[1192] The reputation of the hydropower production project was that the project mainly meant to supply the hometown of the late President Mobutu and its surroundings with electricity. The economic interest of the structure was questioned either by the experts of some

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[1189] See Article 8 of the 25 October 1978 agreement between DR-Congo and Angola.

[1190] *Ibid*.

[1191] See FAO *Treaties concerning the non-navigational uses of international watercourses* – Africa available at *http://www.fao.org/3/W7414B/W7414B00* , accessed on 18 July 2019. The 1978 agreement was an attempt to established states cooperation for the development of the part of the Congo and the Ubangi. See details in the web-link provided in this note.

[1192] Agreement available at *http://www.fao.org/3/W7414B/W7414B00* , accessed on 18 July 2019.

international organisations that specialised in finances or by the public opinion in the DR-Congo.[1193] The Republic of the Congo refused to join this project, whereas the World Bank which was solicited refused to participate in funding the project. Even the Central African Republic was reluctant at the beginning of the project, because of the risk of flooding and changes in the conditions of navigation on the Ubangi River.

6.2.4 The conflict between the two Congos on the international status of the Congo River

6.2.4.1 An overview of the context of the conflict

The conflict's origin was the change of name of the Congo River into *Zaire River* by a unilateral decision of the authorities of the DR-Congo, then also rebaptised Zaire, in October 1971.[1194] The DR-Congo government decided to change the name of the country from "DR-Congo" into a new name, "the Republic of Zaire", and in the same act, the government changed the name of the Congo River, as well as the currency of the country. "Zaire" therefore became the new name of the country, the River, and the state's currency. Such unilateral change of the name of an "international" River by one riparian country did not please the Republic of the Congo, whose government by the mouth of its representative in the 1273rd meeting of the Special Committee of the United Nations on the question of defining aggression, protested the DR-Congo's action.[1195] The representative of the Republic of the Congo qualified such unilateral change of the Congo River's name as a violation of the sovereignty of his country by the DR-Congo.

The following quote is part of the report of the 1273rd meeting mentioned above. It gives a portion of the intervention of Mr Dede who represented the DR-Congo at that meeting:

> "Mr DEDE (Zaire) said that he had been instructed by his Government to inform the Committee of the reasons which had led his country recently to change its name from the Democratic Republic of the Congo to Zaire. "Zaire" was the euphonic

[1193] Mubiala (note 57 above; 37-62).

[1194] For a full account of the history of the Republic of Zaire, see L.J. Winsome *Zaire: Continuity and political change in an oppressive state* (2019); G.N. Nzongola *From Zaire to the Democratic Republic of the Congo* (2004) 28 *Nor Af Inst* 1-25; C. Young & T.E. Turner *The rise and decline of the Zairian state* (1985), 47-70.

[1195] *Ibid*. Winsome.

> adaptation of the word Nzadi, which meant "river". Along its course of over 4,000 kilometres, the river Zaire, which is the lifestream of his country, only touched a foreign borderline over a negligible distance of some 200 km. Juridically, therefore, it was an internal river. The anachronistic provisions of the 1885 Berlin Final Act, declaring that waterway an international river, had ceased to have effect in 1908 when Belgium annexed the fictitious State of the Congo, and the river had become the public property of the State. The Convention and Statute on the Regime of Navigable Waterways of International Concern and Additional Protocol, adopted at the Barcelona Conference of 1921, to which only a small number of States had acceded, had merely replaced the juridical and geographical notion of an international river by the economic one of a waterway of international importance. Nevertheless, Zaire was not subject to such regulations; it maintained its status as an internal river, a national river. His country was therefore fully justified in unilaterally changing the name of a river which belonged to it and was subject only to its domestic jurisdiction."[1196]

Such a stance by the representative of the DR-Congo made scholars such as Mutoy[1197] think that this country supported the doctrine of absolute territorial sovereignty. However, Mr Foungui, who was the representative of the Republic of the Congo at the same meeting, prepared a rejoinder to Mr Dede and his country, which he delivered during the 2025th plenary meeting, on December 18, 1971. In his reply, Mr Foungui evoked both the 1919 Saint-Germain-en-Laye Convention and the 1885 Berlin Final Act to support the international status of the Congo River;[1198] He also broadly concluded his statements by arguing that the legal status of international rivers made their flow to be a shared property of the river's riparian States.[1199] Mr Foungui did not take into account the particularities of the Congo River and its tributaries, especially the transboundary ones, since most of which also have, as explained above highly complex hydrography.[1200]

[1196] See UNGAS 2025th Plenary Meeting, 26th Session, 1273rd plenary meeting (2nd November 1971), 1.

[1197] Mubiala (note 57 above; 22-25).

[1198] See the full rejoinder of Mr. Foungui in UNGAS 2025th PLENARY MEETING, 26th Session, 2029th plenary meeting (21st of December 1971), 12-13. Available at *https://research.un.org/en/docs/ga/quick/regular/26,* accessed on 4 April 2019.

[1199] *Ibid*. UNGAS 2025th Plenary Meeting at 13.

[1200] *Ibid*. UNGAS; See the particularities of the Congo River in section 5.3 above.

In the next session, the representative of the DR-Congo later contradicted all the claims made by Mr Foungui in the following terms:

> "The problem before us and on which we have been attached by the representative of the Congo is one of knowing if the river in question is an internal river or an international one. In the light of the provisions of the General Act of Berlin, which I have just presented to the Assembly, it is clear that the title which Stanley acquired for the benefit of his master, the King of the Belgians, was an entire title that covered the whole river and involved no sharing of it with any neighbour. Up until the present day, this status has never been modified, either by a general convention or by any particular convention among riparian States. The representative of the Congo, in reproaching us for exercising our right to rebaptize unilaterally the river, which is within our exclusive sovereignty and therefore within our internal competence, has tried thereby not only to interfere in our internal affairs but has committed an act which we condemn as being entirely contrary to the law."[1201]

Claiming that in the spirit and the letter, King Leopold II, the main Belgian colonial actor was clear that the Congo River belonged to the DR-Congo, with no intention of sharing it with another country.[1202]

Jackson[1203] argued that the cleavage between the two neighbouring countries was exacerbated by the ideological antagonism, which prevailed between them. The Republic of the Congo belonged to the socialist ideology, whereas Zaire (DR-Congo) was supportive of the capitalist stream.[1204] As it will be briefly discussed below,[1205] the inhibiting character of the ideological choices of the two countries over the technical considerations regarding the shared water resources of the basin showed the dominance of

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[1201] *Ibid.* UNGAS 2025th Plenary Meeting at 13.

[1202] In the way the sharing is claimed by the Republic of the Congo.

[1203] S.F. Jackson 'China's Third World Foreign Policy: The Case of Angola and Mozambique, 1961–93' (1995) 142 *The Ch Quart* 388, 390.

[1204] On the ideologies of the two countries, see generally D. Birmingham & M.M. Phyllis *History of Central Africa. The contemporary years, since 1960* (1998); See also M. Tshiyembe *Géopolitique de paix en Afrique médiane* (2003).

[1205] See section 6.4 below.

the political issues over the technical ones in the field of the shared water resources of the region.

6.2.4.2 Were the two Congos wrong and right at the same time?

After analysing Mr Dede and Foungui's statements above, it transpires that both statements were at the same time right and wrong. Take for a moment the position defended by Monsieur Foungui; after reading him, one cannot help asking the three following questions: *first*, was the internationality of the Congo River an institution of the 1885 Berlin Final Act, or the 1919 Saint-Germain-en-Laye Convention, or was it an international watercourse because of the river's hydro-geographical characteristics? *Second*, after the independence of both states, what was the status of the transboundary tributaries of the Congo River? As these also were internationalised under the 1885 Berlin Final Act.[1206] *Thirdly*, what was the post-independent status of the roads, rails, and other infrastructures to which the 1885 Berlin regime granted an international status as "dependents" of the international waterways of the basin?[1207]

The Republic of the Congo was trying to be persuasive that the Congo River is international, yet it based its arguments on the Colonial status which the river and its tributaries and dependents were given. The representative of the Republic of the Congo may have lost sight of the fact that such international status was granted for colonial purposes and in a purely colonial context, and that it was incumbent on the new states of the Congo basin to start afresh on new non-colonialist bases and negotiate and adopt a legal framework which would reflect the hydrography and the hydrology of the region, just as

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[1206] See section 5.3.3.3. although the Sangha River discharges in the Congo River, it is nevertheless shared only between the Republic of Cameroon and the Republic of the Congo.

[1207] Artcile 16 of the 1885 Berlin Final Act Provides: "The roads, railways or lateral canals which may be constructed with the special object of obviating the in navigability or correcting the imperfection of the river route on certain sections of the course of the Congo, its affluents, and other waterways placed under a similar system, as laid down in Article 15, shall be considered in their quality of means of communication as dependencies of this river, and as equally open to the traffic of all nations…" With this notion of the *dependency of waterways* to a river, the 1885 General Act of Berlin introduced an innovation in international law. Dependencies were roads, railways and side canals whose function were to compensate for the non-navigability or imperfections of the waterways on certain sections. The international regime was extended to them, which meant that they were equally to waterways open to traffic to all nations.

the states of the Niger River basin did.[1208] Instead, the Republic of the Congo further relied on the application of the standard and controversial definition of "International River" to a highly complex hydro-geographical context, without further analysis of the whole surrounding of the issue.

If the Congo watercourse has to be considered an international watercourse, it will be mainly because of the following reasons, which are engraved in the 1997 UNWCC and in the Public International law, as already mentioned:[1209]

1. The fact that part of the Congo River is a boundary forming waterbody;
2. The fact that the Congo River is included in the Congo watercourse, according to the 1997 UNWCC, and as such, it connects with several transboundary tributaries.

A river is international by law, or through its hydrographical characteristics. Nevertheless, what is crucial is not the qualifier of being international or not; what matters is the rights and duties that are attached to such an international or domestic status attached to a watercourse.[1210]

One may wonder what did the Republic of the Congo expect through the recognition of the internationality of the Congo River? and what in particular this country may expect through such recognition for the future, because it is a fact that the Congo watercourse is an international water system, as per the 1997 UNWCC's regime as already discussed.[1211] The problem regarding the Congo River and its three-sections is that there is a need to specify which of these three sections is to be approached as international and which is to remain a domestic section of the river, under the exclusive jurisdiction of the DR-Congo.

It may be an opportunity to recall a crucial episode of the negotiation of the 1997 UNWCC, which was mentioned earlier,[1212] during one of the ILC plenary, around the issue of "which content to give to the international watercourse concept". There was a critical section of a proposition made by some UN member states delegates to the ILC,

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[1208] See section 3.3.2 above.

[1209] See section 2.4.2 above.

[1210] See Nundwe (note 1093 above; 124).

[1211] See section 5.5 above.

[1212] See section 5.6.3 above.

which the appointed ILC Special Rapporteur at that time abandoned. The abandoned proposition was reading as follows:

> "To the extent that parts of the waters in one State are not affected by or do not affect uses of waters in another State, they shall not be treated as being included in the international watercourse system." [1213]

The states from which this proposition emanated sought to obtain a contrast between the parts of a watercourse that could meet the criteria of being international, and the other parts of the same watercourse that could not be considered as being international.

It appears necessary to distinguish between the ecological requirement of approaching a whole hydrographic basin as a single unit, for sustainable preservation and development of the water resources, especially if such hydrographic basin is transboundary, and the internationalisation of all the parts of a watercourse, which in some cases may have unpredicted political consequences. As discussed earlier,[1214] issues concerning the scope of *international watercourses* have become some of the most controversial in the regime of the 1997 UNWCC.

Similar to the Republic of the Congo, the DR-Congo, on the other hand, was both right and wrong. The representative of the DR-Congo tried to be convincing that the Congo River was domestic, on the basis of the river's hydrography, according to which the outlet of the Congo watercourse, which is a transboundary water system, finds itself to be the Congo River, which is a river that is born in one state, from where it also discharges into the ocean. Therefore, the question of the DR-Congo's representative, Dede was: "How can such a river be international whereas it is completely locked within the territory of a single state?" [1215] Sir Dede lost sight of the fact that there was a significant section of the Congo River which formed the boundary between Republic of the Congo, the DR-Congo,

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[1213] See 'Summaries of the Work of the International Law Commission' available at *http://legal.un.org/ilc/summaries/8_3.shtml* , accessed on 13 June 2019. See also ILC *Yearbook of the International Law Commission* (1991), 48.

[1214] See section 4.4.5 above.

[1215] See UNGAS 2025th Plenary meeting, 26th Session, 1273rd plenary meeting (2nd November 1971), 1.

and that, under international law, such a water body is indeed an international river.[1216] What did the DR-Congo expect behind such a claim?

The answer to the above question of Dede seems not as easy as asking it. If one admits that the Congo River is a domestic water body, based on Dede's arguments, what then will the status of the one-third of transboundary waters that discharge into the Congo River? Besides, what about the status of the section of the Congo River that forms the boundary between the two Congos? Also, taking a moment in fiction would show how the above questioning goes infinite. What, for instance, would become of the Congo River should its transboundary tributaries be rerouted from within their states of origin? Perhaps these states wish their rivers to remain domestic if such a choice could be offered to them.

Nonetheless, in the affirmative hypothesis, what would then be the reaction of the DR-Congo vis-à-vis such rerouting of a transboundary tributary of the Congo River, which, in passing, should certainly be devastating for the country, because of all the conceivable environmental, economic and cross-sectorial consequences.[1217] Although utopian, the above reasoning reinforces the conviction that watercourses are natural ecological units, and that they should be approached as such.[1218] States should endeavour to distinct the ecological and political bases of transboundary watercourses.[1219]

6.2.4.3 The need for a definitive sustainable settlement

Concerning the Congo River and its transboundary tributary, further studies are needed on the hydrography and hydrology of this water system with the view of settling the issue regarding the international status of the Congo River. Such studies are crucial for three reasons: firstly, an improved knowledge regarding the hydrography and the hydrology of the

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[1216] See section 2.4.2 above.

[1217] On the rerouting of transboundary rivers and its consequences, see generally J.S. Schiff 'The evolution of Rhine river governance: historical lessons for modern transboundary water management' (2017) 3 (9) *Wat Hist* 279-294; see also C. Nzango *Les barrages de l'Oubangui: de l'impact hydraulique actuel à la prospective environnementale* (unpublished PhD thesis, University of Orleans, 2018), 90-113.

[1218] On the unitary ecological approach of watercourses, see generally sections 2.3 and 2.4 above.

[1219] This is in substance one of the aims of the IWRM approach. See section 2.3.3.5 above for further details. See also Upadhyaya A 'Integrated Water Resources Management and Climate Change Adaptation Strategies' (2016) 3 (5) *Irr Dr Sys Eng*, 4; Merrey et *al.* (note 1057 above); Friesen & Sinobas (note 226 above).

Congo River, which is shared among the riparian states of the basin may have significant incidences in terms of the establishment and the maintaining of fruitful water cooperation across the basin. Secondly, ample efforts are needed to determine, adopt and implement a suitable regime for transboundary water resources that will be reflexive of the particularities of the hydrography of the Congo River system. The claim (which is now codified under Article 3 of the UNWCC) that each watercourse has to be approached as a particular case is critical. Thirdly, such studies will contribute to the pressing need for improved hydrological data across the basin to support the basin-wide decision-making process.

Meanwhile, the opposing conceptions of both countries discussed above would continue through the 1980s and even radicalise in the early 1990s. The antagonism between the two states would dominate their political relations, especially during the reign of late President Mobutu, until his overthrow by Mr Kabila on May 17, 1997, few days after the adoption of the 1997 UN Water Convention. The *status quo* of the regime of the Congo River and its transboundary tributary would remain unchanged until the year 1999, which saw the adoption of the treaty instituting a uniform water regime for the Congo, Ubangi, and Sangha River, as it will be discussed in the next section.

For Mubiala,[1220] two opposing factors were observed: on one side, there was the crucial role that was played by the section of the Congo and the Ubangi Rivers, which are shared by the DR-Congo, the Republic of the Congo, and the CAR. On the other side, there was the legal vacuum created by the independences in the region, as explained above.[1221] The same author argued that during this period of a legal vacuum, the use of the shared waters seemed to be much of mutual tolerance between the riparian states than an actual application of the principle of freedom of navigation.[1222] However, the conjunction of the above two factors caused sporadic navigation incidents to multiply between the ships of these three countries on the Congo and the Ubangi Rivers.[1223] Nevertheless, the navigation on the Congo River continued for all its riparian states despite the vacuum, until the advent of the contemporary regimes on the Congo River and its tributaries.

[1220] Mubiala (note 57 above; 77-87).

[1221] *Ibid*.

[1222] *Ibid*.

[1223] *Ibid*.

6.3 The current regime of the Congo River and its transboundary tributaries

6.3.1 The applicable international legal framework

Sections 4.4 and 4.5 above have discussed the two main international conventions that govern the transboundary watercourses, which are the 1997 UNWCC and the 1992 UNECE Watercourses Convention.[1224] As is the case in most international river basins, the states of the Congo River basin are not part of neither of these two treaties.[1225] Table 11 below summarises the state of the adoption and ratification of the 1997 UNWCC and the accession of the 1992 UNECE across the Congo River basin.

Table 11: Adoption and ratification of the
1997 UNWCC and accession to the 1992 UNECE Watercourses Convention
by the States of the Congo River basin

Country	1997 UNWCC					1992 UNECE
	Favour	Against	Abstention	Absent	Ratification	
Angola	Yes	-	-	-	0	0
Burundi	-	Yes	-	-	0	0
Cameroon	Yes	-	-	-	0	0
Congo	-	-	-	Yes	0	0
CAR	-	-	-	Yes	0	0
Gabon	Yes	-	-	-	0	0
RD-Congo	-	-	-	Yes	0	0
Rwanda	-	-	Yes	-	0	0
Tanzania	-	-	Yes	-	0	0
Zambia	Yes	-	-	-	0	0

Source: United Nations Treaty Collection.[1226]

[1224] See section 4.4 and section 4.5 above.

[1225] See annexe 3 below on the States party to the 1992 UNECE Watercourse Convention and the 1997 UNWCC.

[1226] Status of the ratification of the 1997 UNWCC available at *https://treaties.un.org/pages/viewdetails.aspx?src=ind&mtdsg_no=xxvii-12&chapter=27&lang=en*, accessed on 12 July 2019; Status of the adhesion of the 1992 UNECE Watercourses Convention available at *https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5&chapter=27&clang=_en* , accessed on 12 July 2019.

Since the time of the negotiation and adoption of the 1997 UNWCC, the states of the Congo basin showed little and diverging interest concerning the international regime that was emerging because of this Convention. For the states of the Congo River basin, the 1990s, in general, were a volatile decade. The wind of democratisation that was blowing on the African continent in general and the Congo River basin, in particular, did not allow states' meaningful participation during the negotiation of the 1997 UNWCC regime.

The 1997 UNWCC has generally received very little support from states worldwide. Its delayed entry into force is somewhat an indication of States'disappointment in its regime.[1227] On the day of its adoption of the 1997 UNWCC, three of the Congo basin states were absent, whereas two abstained from voting, and one voted against the convention.[1228] Only four of them voted in favour of the 1997 UNWCC, but failed thereafter to show any further interest in the convention. At the time of the drafting of this thesis, none of the riparian states of the Congo watercourse is part of the 1997 UNWCC.[1229]

As for the UNECE Watercourses Convention, its global opening did not lead to a favorable treatment from the states of the Congo River basin.[1230] None of the riparian states of the Congo watercourse is part of the 1992 UNECE. However, through the CICOS organisation, some states of the region have joined the "global network of basins working on climate change adaptation", which was established by the secretariat of the 1992 UNECE Watercourses Convention in 2013. This global network aims at promoting water cooperation on adaptation in transboundary river basins.[1231] Through this network, the UNECE is

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[1227] *Ibid*.

[1228] The Republic of Rwanda voted against the 1997 UNWCC. Information available at *https://treaties.un.org/pages/viewdetails.aspx?src=ind&mtdsg_no=xxvii-12&chapter=27&lang=en*, accessed on 12 July 2019. See Annexe 1 on the Category of votes by states during the adoption of the 1997 UNWCC.

[1229] See section 4.4.5 above.

[1230] The Interest shown should take one of the forms prescribed by the law. See 1969 Vienna Convention on the law of the treaties.

[1231] See further details in UNECE 'Convention of the Protection and Use of Transboundary Watercourses and International Lakes, Fourth meeting of the global network of basins working on climate change adaptation 14-15 February 2019', available at: *https://www.unece.org/fileadmin/DAM/env/documents/2019/WAT/02Feb_14_15_Fourth_Global_Network_*

assisting river basin organisations and riparian states of transboundary watercourses to adaptat to the impacts of climate change on the waters they share. River basin organisations and riparian states are thus encouraged to exchange experiences, discuss challenges and lessons learnt, and stimulate contacts between the basins' transboudary waters experts.[1232]

In parallel to staying away from the 1997 UNWCC and the 1992 UNECE Watercourses Convention, the states of the Congo River basin have begun developing an internal dynamic of water cooperation through some institutional mechanism of the International Commission of the Congo-Ubangi-Sangha Basin (CICOS), to be discussed in the next section. Such dynamic is a piece of evidence that the states of the basin have recognised the value of those two international Conventions even though they have not yet joined either of them.

In 2018, the DR-Congo and some other states of the Central African Region adopted the Convention for the prevention of conflicts related to the management of shared water resources in Central Africa because of a context dominated by the impacts of climate change on water resources.[1233] In its preamble, the Central African Convention on shared waters affirms its affiliation to both the 1997 UNWCC and the 1992 UNECE Watercourses Convention, event though the signing states refrained from joining the two conventions as just explained.

The Central African shared waters Convention was negotiated within the framework of the Economic Community of the Central African States (ECCAS), with the technical and financial support of the UNECE, under the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, and the African Development

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of_Basins_on_Climate_Change_Adaptation/Global_network_overview_pilot_projects_progress_Feb2019_final_ENGL.pdf , accessed on 15 November 2020.

[1232] See for more details https://www.unece.org , accessed on 15 November 2020.

[1233] These countries are: Angola, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Equatorial Guinea, Gabon, Republic of Congo, Rwanda and São Tomé and Príncipe. Information available at: *https://www.unece.org/info/media/presscurrent-press-h/environment/2017/central-african-countriesapprove-regional-convention-on-transboundary-water-cooperation-with-unece-support/doc.html.,* accessed on 15 November 2020.

Bank.[1234] Its objective is to define the fundamental principles and rules for conflict prevention and resolution around issues relating to the shared water resources of the Central African region.[1235] In fact, the Central African region is endowed with nearly the half of the total volume of freshwaters in Africa, sixteen major transboundary rivers, five transboundary lakes and seventeen transboundary aquifer systems, which are shared by eleven ECCAS state members.[1236]

At the time of the drafting of the present thesis, the Central African shared waters convention was not yet in power. Nevertheless, its adoption by the states of the basin seems to be an indication of their strong political will to implement a locally negotiated regime for the management the region's significant amounts of shared water resources.

6.3.2 The two treaties of the International Commission of the Congo-Ubangi-Sangha basin.

In the sense of this thesis, the CICOS regime is the legal regime that governs the Congo River and part of its domestics and transboundary tributaries, especially those situated on the westwern hemisphere of the territory of the DR-Congo. The CICOS regime is comprised of two treaties. The first treaty is the "Agreement that establishes a uniform regime of navigation on the Congo River and the Ubangi and Sangha Rivers, and creates the International Commission of the Congo-Oubangui-Sangha Basin of 1999", adopted on November 6, 1999, in Brazzaville, Republic of the Congo,[1237] and referred to hereinafter

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[1234] Information available at: *https://www.unece.org/info/media/presscurrent-press-h/environment/2017/central-african-countriesapprove-regional-convention-on-transboundary-water-cooperation-with-unece-support/doc.html,* accessed on 21 November 2021.

[1235] There are key principles of international water law that form the Central African Water Convention's core provisions. These are the principle of equitable and reasonable use of shared water resources; the prevention of water borne transboundary impacts; the establishment of water cooperation across transboundary and regional settings, as well as the peaceful resolution of water related conflicts. Information available at: *https://www.unece.org* , accessed on 21 November 2021.

[1236] Information available at: *https://www.unece.org* , accessed on 21 November 2021.

[1237] The original french denomination of this treaty is "Accord Instituant un Regime Fluvial Uniforme et Creant la CICOS du 6 Novembre 1999". More details on the CICOS available at *https://www.cicos.int*, accessed on 14 July 2019.

as the "1999 CICOS Initial Treaty". The second treaty is the "Additive Treaty to the 1999 Initial CICOS Treaty, adopted on February 22, 2007, in Kinshasa, DR-Congo.[1238]

The 1999 CICOS Initial Treaty was signed between the DR-Congo, the Republic of the Congo, the Central African Republic and Cameroon.[1239] Two reasons led to the adoption of this instrument. *First*, the political will of the states of the basin to put an end to the long-standing legal vacuum and ambiguity which prevailed concerning the transboundary waters of the basin; *second*, the urgent need to define a harmonised fluvial regime which would apply to the Congo River and its transboundary tributaries. With the financial support of the UNECA,[1240] the CEMAC organisation that enjoys the membership of some of the riparian states of the Congo watercourse launched a study concerning the transboundary waters of the basin, and that led to the adoption of a navigation code between the CEMAC and the DR-Congo in April 1999, known as the "CEMAC/DR-Congo internal navigation code".[1241]

The CEMAC/ DR-Congo navigation Code established some navigation standards and rules to be applied within and between the DR-Congo, Cameroon, CAR, Gabon, Equatorial Guinea and Chad, which are all CEMAC countries, except the DR-Congo. It is essential to consider the political scope that is attached to the signing of this CEMAC/DR-Congo internal navigation code, because, as explains Ngoma,[1242] it was the obligatory passage before the negotiation and adoption of the 1999 CICOS Initial Treaty.

A few months after the adoption of the CEMAC/DR-Congo navigation code, the heads of the states of Cameroon, CAR, the Congo, and the DR-Congo met in Brazzaville, Republic of the Congo, in November 6, 1999, and signed the 1999 Initial CICOS Treaty, which also created at the same time the International Commission on the Congo, Ubangi and Sangha Rivers, which is commonly referred to as *CICOS*.[1243] The

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[1238] Information available at *https://www.cicos.int*, accessed on 14 July 2019.

[1239] *Ibid*.

[1240] On CEMAC and UDEAC see note 1156 above; Medinilla (note 951 above; 6).

[1241] It is a navigation code between the CEMAC and the DR-Congo (who is not a CEMAC state member). The 'CEMAC/DR-Congo internal navigation code' is available at *https://www.cicos.int/wp-content/uploads/1-Code-de-navigation-int%c3%a9rieure-CEMACRDC.pdf* , accessed on 14 July 2019.

[1242] Ngoma (note 1125 above; 366).

[1243] The CICOS was instituted by the 1999 CICOS initial Agreement.

CICOS is a joint institution with a specific mandate over the Congo basin's shared water resources, as specified in the two treaties materialising its regime.[1244] The headquarters of the CICOS was established in Kinshasa, DR-Congo, on September 24, 2004.[1245] For Pilarski,[1246] such a choice must have been dictated by the proportions of the DR-Congo within the river basin, and also in the country's significant contribution towards the total volume of the waters that flow through the Congo River, as already discussed.

The initial mandate of the CICOS was to ensure freedom of navigation on the Congo River and its tributaries to the members state of the CICOS, whereas the 2007 CICOS Additive Treaty gave tto this organisation the authority to apply across the Congo River basin the principle of Integrated Water Resources Management which was discussed earlier,[1247] for the management of the basin's shared water resources.

The adoption of the 1999 Initial CICOS Treaty occurred two years after the adoption of the 1997 UNWCC. However, its 35 Articles were entirely navigational and did not include any non-navigational consideration. The state of isolation of the CAR and its quasi total dependence on the Congo and the Ubangi Rivers for country supply with goods and country exportations seem to have significantly contributed to an initial focus of the CICOS regime on navigational issues.[1248] For Ngoma,[1249] the 1999 Initial CICOS Treaty was instead a successor to the 1885 Berlin Final Act, from which, the author thought the treaty inherited both its spirit and letter.

Despite such criticism, the 1999 CICOS Initial Treaty was for some observers a successful step towards the establishment of water cooperation across the

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[1244] See Articles 16 and 17 in the 1999 CICOS Initial Treaty and Articles 2 and 3 of the 2007 CICOS Additive Treaty.

[1245] The agreement between the DR-Congo and the CICOS to establish CICOS' headquarters in Kinshasa, signed on September 24, 2004 is available at *https://www.cicos.int* , accessed on 14 July 2019.

[1246] C. Pilarski (note 1158 above; 70).

[1247] See section 2.2.6 above.

[1248] The supply of the CAR in goods and the country's exportations depends to a considerable extent on the Pointe Noire harbour on the high sea, situated in the Republic of the Congo. See for more details on the 'Port autonome de point noire' *http://www.papn-cg.org/fr/accueil/* , accessed on 23 March 2019; See Map 6 concerning the geographical positioning of the two Congos vis a vis each other.

[1249] Ngoma (note 1125 above; 366).

Congo River basin.[1250] However, with such an exclusive focus on navigation, the 1999 CICOS Initial Treaty could not yield much results from a non-navigational viewpoint. There was therefore a need to readjust the mandate of this still young commision Not only that but also early in the decade of 2000-2010, the Integrated Water Resource Management strategy (IWRM) was seen as an answer to the increasing complexification of transboundary water issues at a global scale. Seeing that most donor agencies operating in the water sector adopted the IWRM as a new guiding principle for their interventions in transboundary contexts, the CICOS seized this opportunity to adopt the IWRM principle and therefore extend its mandate to the non-navigational uses of the basin's transboundary watercourses.[1251]

6.3.3 The non-navigational uses of the waters of the Congo River and its transboundary tributaries under the CICOS regime.

The states party to the 1999 CICOS Initial Treaty decided to upgrade this agreement from a navigation-centred regime into becoming a treaty of broader scope, which would include the non-navigational uses of the waters of the Congo watercourse that were under administration of this 1999 CICOS Initial Treaty. The new agreement was to be founded on the IWRM approach. The non-navigational aspects that were to be included were in general those that were left behind by the 1999 CICOS Initial Treaty.[1252] In 2005, under the impulse of the 12th Conference of the ECCAS, which was held in Brazzaville, with the aim of extending the mandate of the CICOS, this later would draft an annexe to its

[1250] See for instance Medinilla (note 951 above; 8), who argued that the 1999 CICOS initial Treaty constituted "a recognition of a basin-wide community of interests"; see also Ngoma (note 1125 above; 367).

[1251] See section 2.3.6 above for more information on the IWRM approach. These donors included Multilateral, bilateral and NGO organisations operating in the water sector, such as the World bank, the UN, the USAID, and others. For further, see Chris White (June 2013) 'Integrated Water Resources Management: What is it and why is it used?' available at *http://www.globalwaterforum.org/2013/06/10/integrated-water-resources-management-what-is-it-and-why-is-it-used/* , accessed on 12 June 2019.

[1252] Articles 2 and 3 of the 2007 CICOS Additive Treaty.

1999 Initial Treaty, in which were addressed some non-navigational uses of the rivers of the treaty.[1253]

With the support of the UNEP, the signing of an additive text in complement to the 1999 CICOS Initial Treaty would take place at the 5th ordinary session of the CICOS steering committee, which was held on December 13, 2007, in Yaoundé, Cameroon, where the CICOS' member states reaffirmed their will to see the institution play its role as a river basin organisation.[1254] The 2007 additive text would be adopted on February 22, 2007 , as the "2007 Additive Treaty to the 1999 CICOS Initial Treaty". It comprises 23 Articles and seven titles, and aims at "promoting the integrated management of water resources on the territory under the jurisdiction of the CICOS".[1255] Besides the integration of the IWRM approach, the additive treaty also expands the scope of the CICOS regime to all parts of the Congo River basin situated on the territories of the member states.[1256] The additive treaty further enumerated the principles and objectives associated with an integrated approach to the management of water resources, but remained generally vague on how the IWRM approach was to be implemented throughout the Congo River basin.[1257]

However, it was thanks to the above extension of the initial mandate of the CICOS that the legal framework that governs the Congo River and its transboundary tributaries became responsive to the climate change phenomenon. It is also through such mandate extension that it will be possible to assess, here below, the effectiveness of the CICOS regime concerning the integration of the climate change dimension.

Titles II (Object and field of application), III (Principles and terms of use of the waters), and IV (Protection and preservation of the environment) of the 2007 Additive Treaty are more particularly crucial concerning the integration of the non-navigational uses of the waters of the Congo River and its tributaries. Amongst other things, the additive's

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[1253] *Ibid*.; The French original title of this treaty is " Additif a l'Accord Instituant un Regime Fluvial Uniforme et Creant la CICOS, du 6 Novembre 1999 du 22 fevrier 2007". For further historical details consult concerning the 2007 CICOS Additive treaty, see *http://www.cicos.int/* , accessed on 26 April 2019.

[1254] Information available at: *http://www.sadieau.org/actus/communique-final-neuvieme-session-ordinaire-comite-des-ministres-cicos* , accessed on 10 July 2019.

[1255] See Artciles 2 and 3 of the 2007 CICOS Additive Treaty.

[1256] See Article 1 (15) of the 2007 CICOS Additive Treaty.

[1257] Medinilla (note 951 above; 7).

two articles under title II specify that the additive's objective is to set the principles and approaches that should be observed while using the waters of the Congo River and its tributaries which are covered by the CICOS regime.[1258]

The ten articles that comprise title III of the 2007 Additive Treaty provide in detail all the principles and conditions of the use of the waters covered by both the 1999 CICOS Initial Treaty and the 2007 CICOS Additive Treaty. The principles under this title include the equitable and rational utilisation of transboundary waters, the principles of cooperation, prior notification, and peaceful settlement of water conflicts.[1259] Most of these principles were discussed earlier, and are based on the principles which are proclaimed under the 1997 UNWCC. [1260]

Title IV "Protection and preservation of the environment" provides, among other things, for the protection of the fluvial ecosystems and charges the riparian states of the Congo River basin to manage the shared water resources in consideration of the natural characteristics of the hydrosphere, including the natural equilibrums of the fluvial ecosystems.[1261]

6.4 The hydropolitics of the Congo River basin and the CICOS regime: an overview

6.4.1 General considerations

Mollinga[1262] once contended that water was highly political and that there was no need for any defender to stress or defend further what was already so obvious. The reason water resources have become eminently political, and politics have become preeminent in river basin management is linked to the level of the stakes that the resource entails. Haran[1263]

[1258] See Articles 2 and 3 of the 2007 CICOS Additive Treaty.

[1259] See Articles 4, 5, 6, 7, 8, 9 and 10 of the 2007 CICOS Additive Treaty.

[1260] See section 4.3. above.

[1261] See Articles 14 of the 2007 CICOS Additive Treaty.

[1262] P.P. Mollinga 'Water and Politics: levels, rational choice and South Indian canal irrigation' (2001) 33 (8-9) *Futures 733, 752*.

[1263] V. P. Haran 'Water and hydropower cooperation in BBIN countries: Policies and way forward' (2018) *Int J of Wat Res Dvpment*, 1, 1.

found out that in the colonised world, most regimes to govern shared water resources have not progressed due to political reasons.

Water means life; it also means power, food, money, safety, and more. From a river basin perspective, the networks formed by the transboundary watercourses means higher potentials for trade and interstate exchanges, economic cooperation, conflict prevention activities, joint projects for environment protection, peacemaking programs, all of which are highly contributive to regional stability and security and international trade and development.[1264]

As explained by Sanders,[1265] problems, and solutions that are associated with shared water resources in transboundary contexts often depend directly on the positions of the individual riparian countries that are involved in the transboundary water system. This is nothing less than the truth in the case of the states of the Congo River Basin, whose hydropolitics are to be shortly considered. The researcher should perhaps add his voice to those of many other scholars who have expressed their amazement before the paradoxical reality of the enormous potential for the development of the Congo River basin against its endemic level of poverty. As far as the contribution of water resources to the wealth of the region is concerned, it seems natural to notice that the basin state's hydropolitics have been a major limiting factor.

Turton[1266] defined hydropolitics as "the authoritative allocation of values in society concerning water". The recognition of the political dimensions of water resources is relatively new,[1267] but debates in that respect are almost over because the issue has been

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[1264] B. Pohl & A. Swain 'leveraging diplomacy for resoving transboundary water problems' in S. Islam & K. Madani (eds) *Water diplomacy in action. Contingent approaches to managing complex water problems* (2017), 19, 20.

[1265] UNEP (a) (note 12 above; xvi).

[1266] A. Turton 'Hydropolitics: the concept and its limitations' in A. Turton & R. Henwood (eds.) *Hydropolitics in the developing world: A Southern African perspective* (2002) 13-17. See also Easton's definition of the concept: "The authoritative allocation of values in society" See D. Easton *A systems analysis of political life. Ney York, Wiley* (1965); See also R. Jankielsohn 'Defining hydropolitics: the politics of water in South Africa' (2012) 37 (1) *J for Cont His* 123, 124.

[1267] K. Wegerich & J. Warner *The politics of water: A Survey* (2010), 2*;* The World Water Council seminar held in Marseille in France in 2004, which was dedicated to the issue of Water and Politics was the first

sufficiently internalised. As argues Wegerich & Warner,[1268] one would be convinced about this level of interiorization if one could just consider the developments that have taken place around water resources in the last three decades.

The rise of awareness on the looming water crisis worldwide, followed by a growing wind of water multilateralism, has contributed mainly to the awakening of conscience in the public opinion worldwide on the stakes that exist around water resources. States that possess significant reserves of waters, such as the riparian states of the Congo watercourse are no longer looking at the blue resource as a naturally flowing asset but as a factor of might. As would posit Cessna,[1269] "water is no longer taken for granted".

States' politics or even States' absence of politics on water resources can explain collisions betwen states or communities over shared water resources.[1270] For Pohl,[1271] the politics surrounding shared water resources are often controlled by state power asymmetries. Therefore, it seems reasonable that within a single river basin, the interests of the riparian states may be divergent or even contradictory. States may not have the same apprehension and approach, for example, concerning future developments concerning a shared watercourse in terms of major infrastructure projects. In a context which is dominated by diverging interests, the emergence of a riparian state that will position itself as the basin's hydro hegemon seems therefore understandable.

It looks, therefore, timely to introduce some facts regarding the hydropolitics in the Congo River basin. This is because the whole CICOS regime as exposed above and the likelihood of ensuring successful climate change integration in the regime lays on the political stances of the states of the basin which are discussed below. The success, the

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forum of that sort for that notable organisation. Information available at *https://www.worldwatercouncil.org/en/publications/world-water-council-biennial-report-2004-2005*, accessed on 20 April 2019; Scholars such as Allan, a geographer by training, and institutions such as *the Irrigation and Water Engineering group of the Wageningen University*, made a significant contribution in the water sector through convincing their peers of the negative and damaging implications of ignoring hydropolitics.

[1268] *Ibid*. Wegerich & Warner.

[1269] See gerenally C. Cessna *Water: No Longer Taken for Granted* (1993).

[1270] Wegerich & Warner (note 1270 above; 3).

[1271] Pohl & Swain (note 1267 above; 20).

consolidation or even the survival of the CICOS regime depends on the individual position of the basin's states on the Congo watercourse, and their willingness to achieve meaningful water cooperation across the basin.

There are three member states of the CICOS organisation that form the group of the core riparian states of the Congo River. These include the DR-Congo (62 percent of the basin), the Central African Republic (11 percent of the basin), and the Republic of the Congo (7 percent of the basin).[1272] These three countries depend to a greater extent on the waters of the Congo River and its tributaries for their economies and transportation. When stressing the importance of the Congo watercourse for these three countries, Medinilla[1273] observed that even the capital cities of all three states lay on the fluvial axis formed by the Congo and Ubangi rivers. Of these three states, the DR-Congo and the Republic of the Congo seem to be the most volatile states concerning water cooperation at the river basin level. The hydropolitics of these two countries will need careful consideration because the success of any transboundary water regime that is applicable to the basin will depend on them to a significant extent.

6.4.2 The position of the Democratic Republic of the Congo

The Democratic Republic of the Congo is the largest state of the Congo River basin. Its national area is estimated at roughly 2,345,095 km^2, while 40 percent of its population of about 80 million souls live in urban areas.[1274] From a geographical viewpoint, the DR-Congo is the most important country of the basin (the DR-Congo contributes to the total size of the Congo River basin up to 62 percent; besides, 99 percent of the total surface of the DR-Congo is covered by the Congo River basin).[1275] The country is a mineral-rich state, with the potential of becoming one of the wealthiest economies on the continent, provided its political instabilities are settled, and its governance improved.[1276]

[1272] Medinilla (note 951 above; 19).

[1273] *Ibid*.

[1274] See World Bank Group 'DR-Congo Country overview' available at *https://www.worldbank.org/en/country/drc/overview* , accessed on 6 May 2019.

[1275] Medinilla (note 951 above; 19).

[1276] See World Bank Group 'DR-Congo Country overview' available at *https://www.worldbank.org/en/country/drc/overview*, accessed on 6 May 2019.

Concerning the shared water resources of the basin, the country's current political instabilities and its gloomy economic situation have hampered it from entirely playing a leading role and federating the other states around a shared vision on the waters of the Congo River. The country tolerates few interferences from outsiders, including neighbouring countries on issues regarding the Congo River. The CICOS headquarters are established in Kinshasa, the capital city of the DR-Congo, doubtlessly in recognition of the country's dominant position in the basin. However, the country struggled to honour its financial engagements in support of the budget of the functioning of the CICOS.[1277]

On a more politico-legal plan, the DR-Congo did not ratify the navigation code, which it signed with the CEMAC in anticipation of the adoption of the 1999 CICOS initial treaty. The fact that the country has refused to ratify the CEMAC/DR-Congo navigation code is an indication of malaise regarding the content of the navigation code. Surprisingly, according to Medinilla, [1278] the DR-Congo has been active in utilising the CICOS structure (which is initially an initiative of the CEMAC) in bilateral negotiations with the other states of the basin.[1279] Besides, from a regional viewpoint, the DR-Congo is not a member state of the CEMAC. The country is instead a member state of some other regional organisations, including the ECCAS and the SADC.

Concerning the project of transferring waters from the Ubangi River to the Lake Chad that is mentioned above,[1280] the DR-Congo has generally expressed its opposition, because of the possibility of significant environmental and economic fallouts of such project across the Congo River basin.[1281] Although opposed to such an idea, the

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[1277] A rear of contributions, which the country accumulated from the year 2004 to 2013, and settled later, under threats from the other CICOS member states of relocation of the CICOS secretariat; see details in Medinilla (note 951 above; 19).

[1278] *Ibid*.

[1279] *Ibid*.

[1280] See section 5.6.2 above.

[1281] See C. Haushofer (April 26 2018 / Modified on October 1 2019): 'DRC: Kinshasa says no to water transfer from Oubangui River to Lake Chad' available at *https://www.afrik21.africa/en/drc-kinshasa-says-no-to-water-transfer-from-oubangui-river-to-lake-chad/*, accessed on 15 June 2019; South World News (June 2018) 'Kinshasa Vetoes Water Transfer Project To Replenish Lake Chad' available at *https://www.southworld.net/kinshasa-vetoes-water-transfer-project-to-replenish-lake-chad/* , accessed on 15 June 2019.

DR-Congo seems favourable to a water transfer that would instead drain directly from the lower section of Congo River, at some identified sites downstream the Inga dams.[1282]

The SADC community has comparable covetousness over the waters of the Congo River basin, as also discussed earlier.[1283] In this regard, the SADC is most probably considering the DR-Congo as a privileged ally for future water transfers, because the DR-Congo is a member state of the organisation. However, here also, the DR-Congo which joined the SADC organisation in 1999 has never signed neither ratified the SADC Protocol on shared watercourses of 2000.[1284] However, because of the predicted water imbalances across the SADC region sooner, and the oversupply of waters across the Congo River basin, the organisation might probably be influential towards the decision of the DR-Congo to accept to transfer its waters southwards to supply the SADC region rather than northwards to replenish the Lake Chad.

Moreover, on April 29, 2018, the DR-Congo refused to sign the protocol of agreements for the creation of the Blue Fund for the Congo basin, which is an initiative that was launched by the Republic of the Congo, and which aims at redefining the bases for a sustainable management of the waters of the Congo River and its tributaries.[1285] There is no doubt that the DR-Congo did not very much appreciate such an initiative, which the Republic of the Congo has started around the transboundary waters of the Congo basin, for which, as a riparian state this country only contributes little.[1286]

[1282] The Inga Dams are situated at 5^0 31'09'' S and $13^0$37'19''E, information available at *https://tools.wmflabs.org/geohack/geohack.php?pagename=Inga_dams&params=5_31_09_S_13_37_19_E_type:landmark*, accessed on 15 June 2019.

[1283] See section 5.6.2 above.

[1284] See more information on the looming water crisis in the SADC Region in section 5.6.2; The SADC Protocol on shared watercourses was adopted in August 07, 2000, and entered into force in September 09, 2003. Information on the SADC Protcol on watercourses and its state of ratification available at:

[1285] L. Dianzenza 'Bassin du Congo: la RDC refuse de signer le protocole instituant le Fonds bleu' available at *http://www.adiac-congo.com/content/bassin-du-congo-la-rdc-refuse-de-signer-le-protocole-instituant-le-fonds-bleu-82801*, accessed on 20 June 2019.

[1286] On the contributions of the riparian states of the Congo River towards its waters, see section 5.3 above.

6.4.3 The position of the Republic of the Congo

The Republic of the Congo is the second case in the Congo River basin's hydropolitics. The country has a national area that is estimated to 342,000 km^2 and a population of about 5,2 million people, of which more than 50 percent live in urban areas.[1287] From an economic viewpoint, the Republic of the Congo has a strong dependence on the Congo, the Ubangi, and the Sangha Rivers. The Republic of the Congo is riparian to both the Ubangi and the Sangha Rivers. The Congo and the Ubangi Rivers flow in a distance of more than 70 percent of the southern boundary of the Republic of the Congo with the DR-Congo. Even though the country represents only 7 percent of the area of the Congo River basin, its ambitions are higher for playing a leading role within the basin and its water resources in particular.[1288] This hardly expressed ambition is what often provokes clashes between the two Congos regarding the majestic Congo River. The conflict that erupted in 1971 between the two countries is an illustration of this.

The Republic of the Congo is one of the country drivers of the CICOS organisation; the country is active in the field of international cooperation for the sake of the Congo River basin and ensures steady support to the CICOS.[1289] However, in December 2016, in Marrakech, Morocco, at the occasion of the 22nd COP to the UNFCCC, the President of the Republic of the Congo Mr Denis Sassou N'guesso launched the initiative of the creation of the Blue Fund for the Congo basin which was mentioned earlier.[1290] The aim of the Blue Fund for the Congo basin is to redefine the bases of a collaborative

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[1287] See World Bank Group 'Republic of the Congo, Country overview' available at *https://www.worldbank.org/en/country/congo/overview* , accessed on 6 May 2019.

[1288] See table 4 above on the "Elements of the profile of the surfaces of the States of the Congo Basin".

[1289] The fact that the CICOS initial treaty was adopted in Brazzaville, Republic of the Congo, and also the country is one of the most up to date regarding states funding towards the budget of the organisation are significant evidence of the country's support to the organisation. See more detials in: *http://www.cicos.int/*, accessed on 26 April 2019.

[1290] See Medinilla (note 951 above; 19); For ample details concerning the Congo Basin Blue Fund see the Brazzaville Foundation 'Congo Basin Blue Fund' available at *http://brazzavillefoundation.org/images/nos-actions/congo-basin-blue-fund.pdf* , accessed on 6 May 2019; See also M.I. Peya *The Blue Fund: Mechanism of financing and management of the Congo Basin for the protection of the global environment* (2018). Furtghe details on the blue fund available at *http://www.fondsbleubassinducongo.org*/ accessed on 25 January 2019.

economy, which will associate rational exploitation of forests and sustainable management of the waters resources, including the Congo River and its tributaries.

This gesture of the Republic of the Congo was diversely interpreted. Some observers saw in it the will of Brazzaville to take up a leading position among its peers of the Congo River basin in the control of the shared water resources, whereas others saw instead a will to weaken the CICOS and give a vital role to the Blue Fund for the Congo basin regarding the negotiations around the water resources of the Congo Basin.[1291] Regardless of whether either of these speculations will be proven right or wrong, the decision of the President of the Republic of the Congo to launch a Blue Fund for the Congo basin which targets the waters of the Congo River and its transboundary tributaries, while the CICOS is fully operational was in itself a source of speculations and suspicions. For Medinilla,[1292] the creation of this fund expresses the limits that the Republic of the Congo has traced to the CICOS as the joint institution of the Congo River basin. For the same author, the developement of the Blue Fund for the Congo basin will reflect a progressive reduction of the faith that the Republic of the Congo placed in the mandate of the CICOS.

6.4.4 The position of the Central African Republic

The Central African Republic (CAR) is the third hydro political case within the Congo River basin.[1293] The country has a surface area of 622,984 km^2 and has a population that is estimated to be some 4,6 million inhabitants.[1294] The cycles of political and military

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[1291] *Ibid*. Medinilla; Follow for instance the debate regarding the relationship between CICOS and the blue fund by the Blue Fund's General director, David Richmond, in December 5, 2016, available at *http://www.adiac-congo.com/content/sir-david-richmond-les-peuples-du-bassin-du-congo-ont-le-droit-dacceder-une-meilleure*, accessed on 6 May 2019.

[1292] Speech of President Paul Kagame of the Republic of Rwanda, at the heads of State gathering at the Congo Basin Climate Commission, on April 29, 2018. "The water resources of the Congo Basin connect our countries and support the livelihoods of hundreds of millions of people. This makes us interdependent on many levels. We must therefore cooperate more in managing these shared resources, in order to safeguard food security, public health and economic opportunities." Available at *https://ktpress.rw/2018/04/kagame-defends-the-congo-basin-blue-fund/*, accessed on 27 June 2019. *Ibid*. Medinilla.

[1293] *Ibid*. Medinilla.

[1294] See World Bank Group 'Republic of Central African Republic, Country overview' available at *https://www.worldbank.org/en/country/cameroon/overview*, accessed on 25 July 2019.

instabilities that have settled in the country since 2013 have prevented its government from playing a significant role in regional matters, including in the CICOS organisation.[1295] The country, yet, looks as if it has recovered, as of 2016, since a successful democratic election that brought a new leadership at the national level to power. Unlike the two Congos, the CAR is divided between two hydrographic basins, which are the Lake Chad basin northwards, and on the Congo River basin southwards.[1296] Such geographical location puts the CAR in a delicate position because the two basins represent very diverging interests.

The country represents 9 percent of the Lake Chad basin, even if it does not have any physical contact with the Lake Chad, against 11 percent of the Congo River basin. It provides a significant amount of waters to the Congo watercourse through the Ubangi River, of which it is the leading riparian state.[1297] The Chari River, which is the main tributary of the Lake Chad, originates from the CAR and represents the inflows that discharge into the Lake Chad.[1298] The northern part of the country, which is part of the Lake Chad basin, is also its most populous region. The threat represented by the progressive disappearance of the Lake Chad which was evoked earlier constitutes a severe threat to the CAR, both in security and in humanitarian terms.[1299] This is part of the reasons why this country is willing to participate in a solution that aims at saving Lake Chad.

The Lake Chad Basin Commission (LCBC)[1300] did not initially include the CAR. The country only joined the Commission in 1996. The northern region of the country is covered by the Lake Chad basin and is looked at as a region at risk due to the progressive disappearance of the Lake Chad Basin. Because of that, the country is active in finding a solution to the tragedy around the disappearance of the Lake Chad and is under pressure from its peers of the LCBC to push for the project of water transfer from the Ubangi River.

[1295] Medinilla (note 951 above; 19).

[1296] See for an illustration Map 4 on the Network of streams that forme the Ubangi Sub-River basin.

[1297] See details on the Ubangi River in section 5.4.2 above.

[1298] Further details on the Chari River available at *https://www.britannica.com/place/Chari-River*, accessed on 27 June 2019.

[1299] See section 5.6.2 above.

[1300] The Lake Chad Basin Commission (LCBC) was established on May 22, 1964 by the four countries that directly border the Lake Chad: Cameroon, Chad, Niger, and Nigeria. The CAR joined the organisation in 1996 and Libya was admitted in 2008. Information available at *http://www.cblt.org/en/tags/lcbc* , accessed on 27 June 2019.

The initial project of water transfers to save the Lake Chad was supposed to draw waters from the Ubangi River from within the CAR territory. Southwards, the country is a member state of the CICOS and has to align with the official position of the organisation, which has not yet given its acceptance regarding the transfer of the waters of the Ubangi River into the Lake Chad. Being at the same time the applicant (through the Lake Chad basin) and the bidder (through the Congo River basin) regarding this issue of water transfer, the position of the CAR can be confusing the tracks in future.

6.4.5 The position of the Republic of Cameroon

The Republic of Cameroon constitutes the last significant hydro political case within the Congo River basin in the present context, although this one may evolve in the future with the recent accession of the Republic of Angola in the CICOS. The country has a national area of approximately 475,442 km^2, with a population of 24 million inhabitants.[1301] Cameroon is a country part of three hydrographic basins, namely the Congo and the Niger Rivers basin, and the Lake Chad Basin. The share of the country in the total area of the Congo River basin and the Lake Chad basin is 2.70 percent and 2.0 percent respectively.[1302] As for the Congo River basin, Cameroon's membership is because the country holds the headwaters of the Sangha River, which it shares with the Republic of the Congo. Unlike the case of the Central African Republic, Cameroon is a founding member of the LCBC and has comparatively lesser interests in the Congo River basin than in the Lake Chad Basin.

Although in geographical terms, Cameroon is only a little involved in both hydrographic basins, the country has managed to be politically active in each of them. Besides, the country is a leading player in several regional platforms, including the CEMAC, which significantly contributed to the idea of creating the CICOS.[1303]

For the Republic of Cameroon, even if the country has only a relatively marginal stake in each of the above basins, the combination of these three shares becomes significant to the country. The combination of the shares of the country in the three river

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[1301] See World Bank Group 'Republic of Cameroon, Country overview' available at *https://www.worldbank.org/en/country/cameroon/overview* , accessed on 25 July 2019.

[1302] Medinilla (note 951 above; 19).

[1303] See section 6.2.5.2 above.

basins represents a significant portion of Cameroon's national area; that is perhaps the reason why the country is actively engaged in all the politics and activities regarding the three river basins it forms part of.[1304] Cameroon's active participation in the dialogues regarding the three river basins allows the county to understand and control better the hydropolitics of the region and position itself as a key player, a favourite ally during negotiations and votes of significant decisions regarding all these three basins.

6.4.6 The position of the Republic of Angola

The case of the Republic of Angola will be mentioned briefly in this section because the country had just joined the CICOS in 2015.[1305] The Republic of Angola has a national area of 1,247,000 km^2, with a population of around 28.8 million inhabitants.[1306] The country shares a significant border with the DR-Congo at the lower section of the Congo River and controls the headwaters of the Kasaï River, which is the main tributary of the Congo River.[1307] Because of that, Angola may become a key player in the Congo River basin in the future. Besides, the Republic of Angola is also a member state of the Zambezi and the Cunene River basins. Both the DR-Congo and Angola are member states of the SADC community.

For some observers, the accession of Angola to the CICOS has reinforced the organisation, in balance to the questionable move that the Republic of the Congo has taken. It has also shifted the emphasis of the CICOS a bit further away from the CEMAC and has pulled it towards the ECCAS and the SADC.[1308] Medinilla[1309] observes that the institutional relationship between the CICOS and the ECCAS has been the object of continuous interrogations since the establishment of CICOS in 1999. Nevertheless, with the accession of the Republic of Angola in the CICOS, which joined the DR-Congo, there is a higher expectation of the reinforcement of the influence of both the SADC and the

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[1304] Medinilla (note 951 above; 19).

[1305] *Ibid*.

[1306] Statistics of the year 2019. See World Bank Group 'Republic of Angola, Country overview' available at *https://www.worldbank.org/en/country/angola/overview*, accessed 07 July 2019.

[1307] The flow rate of the Kasai River is 12,000 cubic meters per second of water discharged in the Congo River. See section details in 5.4.1 above.

[1308] Medinilla (note 951 above; 19)

[1309] *Ibid*.

ECCAS organisations on the CICOS, and thereby on the water resources of Congo River basin. It is argued that the SADC and the ECCAS' influences on the CICOS would proportionally balance the influence of the CEMAC, on which the CICOS will still much depend on funding.[1310]

6.5 Conclusion

Chapter 6 has discussed the legal framework that governs the Congo River and its transboundary tributaries. The chapter aimed at identifying and examining the existing agreements that apply to the Congo River and its transboundary tributaries. These agreements will, at a later stage of this thesis, be assessed regarding the extent to which they have integrated the climate change dimension. The chapter began by outlining the historical evolution of the legal regime that governs the Congo River and its tributaries, before discussing its current stage. This was done with the view of giving a summary of the context that has prevailed in the birth and evolution of a legal regime that is applicable to the Congo River and its tributaries. Key historical steps have included the precolonial, colonial, and the post-colonial epochs, down to the contemporary format of the regime. In a later stage, this chapter has described the regime that currently governs the waters of the Congo River and its transboundary tributaries. The regime that was described includes the Agreement of 1999 that established a uniform regime of navigation on the Congo, Ubangi and Sangha Rivers, and created the CICOS and its additive treaty of 2007. This chapter has, at last, discussed the hydropolitics around the waters of the Congo River and its transboundary tributaries, and explored from different perspectives, the stances of the key riparian states of the Congo River. From the discussions that were undertaken in this chapter, the political role played by each state of the Congo basin seems to be much evident. Equally, much clear are the contexts that have prevailed for the construction of the current legal regime that governs the waters of the Congo River basin. Based on such lights, it has become thinkable to formulate, in a later stage, some recommendations regarding the improvement of the regime that this chapter has examined.

Having discussed the legal framework that governs the Congo River and its transboundary tributaries, this thesis will, in the next phase, introduce and discuss the

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[1310] *Ibid.*

framework of criteria that facilitates the assessment of a transboundary water treaty concerning its effective integration of the climate change dimension.

PART V

CLIMATE CHANGE-RELATED REGIME ASSESSMENT

AND FLOOD REGIMES COMPARATIVE ANALYSIS

7 CRITERIA FRAMEWORK FOR WATER TREATY ASSESSMENT ON TAKING INTO ACCOUNT THE CLIMATE CHANGE DIMENSION

7.1 Introduction

The previous parts of this thesis have discussed the theoretical framework of the international law of transboundary water resources, and have described the hydrography and the legal framework that governs the Congo River and its transboundary tributaries. This chapter sets out to introduce and discuss a framework of criteria, referred to as *Cooley & Gleick's criteria framework*, which, this thesis will apply for the assessment of the legal regime that governs the Congo River and its transboundary tributaries as to the integration of the climate change dimension. *Cooley & Gleick's criteria framework* is a tool that assesses the extent to which a treaty on transboundary water resources integrates the climate change dimension. Its choice in this thesis is justified by its practicality, its effectiveness, its straightforwardness, and its simplicity to apply. Yet, the effectiveness of a transboundary water regime in dealing with climate change impact will be achieved not only through ensuring treaty flexibility in the face of changing climatic conditions, but also through addressing any specific challenge to be caused by the phenomenon, which challenges vary from one river basin to the other. In the case of the Congo River basin, predictions state that the impact of climate change on the basin's hydrology will result in seasonal floods. Therefore, exploring the extent to which the regime that governs the Congo River and its transboundary tributaries has taken into consideration the climate change dimension, will require that this thesis includes a step of verification of the extent to which the Congo River's regime is responsive to floods. It follows that this thesis will complement the application of *Cooley & Gleick's criteria framework* on the Congo River's regime (to be discussed in this chapter) with a comparative analysis between the legal regimes that addresses floods in the Congo and the Rhine River basins (to be discussed in the next two chapters). This chapter comprises five sections. The first section introduces some general considerations regarding climate change and water treaties, while the following four sections discuss Cooley & Gleick's fourfold criteria framework, which includes *i.* the flexible water allocation strategies and water quality standards, *ii.* the response strategy for extreme weather events, *iii.* the treaty amendment and review process, and *iv.* the joint institutions.

7.1.1 General considerations

The generations of water treaties that were negotiated before the advent of climate change were based, in general, on the hypothesis that water supply will remain constant in the future.[1311] In some regions of the globe, at some epochs, issues concerning water quality did not preoccupy transboundary water lawmakers.[1312] However, the context has now significantly evolved and has dictated the integration of water quality considerations in transboundary water treaties. As abundantly discussed throughout this thesis, predictions state that climate change will increasingly affect both water quantity and quality.[1313] Most of the water treaties that were signed before the discovery of the current episode of climate change did not include any mechanism that could help address the impacts of the changing climatic conditions such as water variability on the shared water resources.[1314]

Earlier enough, McCaffrey[1315] predicted that water variability and instability would soon become usual phenomena, the reason why, concluded this author, it has become crucial to integrate some treaty mechanisms that create flexibility in transboundary water regimes, for adequate responsiveness to climate disruptions.

In recent years, a large and growing body of literature investigated the issue of climate change and transboundary water laws.[1316] Most of them set out to understand how the law in different sectors and at different levels of governance reacts to the changing climatic conditions and its rosary of consequences on ecosystems and natural resources,

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[1311] Cooley & Gleick (note 352 above; 715); Ludwig *et al.* (note 1082 above; 236).

[1312] On the integration of water quality into transboundary water agreements, see generally M. Köppel & D. F. Sprinz 'Do Binding Beat Nonbinding Agreements? Regulating International Water Quality' (2019) *J of Conf Res* 1; L.L. Bennett 'The integration of water quality into transboundary allocation agreements Lessons from the southwestern United States' (2000) *24* (1) *Agr Eco* 113-125.

[1313] See section 5.6.1 above.

[1314] Tarlock (note 392 above; 190-191).

[1315] S.C. McCaffrey (f) 'The need for flexibility in freshwater treaty regimes' (2003) *Nat Res for* 156, 157-159.

[1316] See for instance J.W. Dellapenna 'Book review' Michael Kidd *et al.* (eds) *Water and the Law: Towards Sustainability* (2014)." (2017) 1 (8) *J of Hum R & the Env* 172-175; A. Earle *et al. Transboundary water management and the climate change debate* (2015).

including waters.[1317] Bates,[1318] for instance, noticed that the majority of agreements that are in place in transboundary river basins worldwide do not take into account the impact of climate change on the waters, which the agreements were adopted for. Wouters[1319] made similar observations, but with more focus on Africa, and discovered that most of the continent's transboundary water treaties did not integrate any climate change dimension.[1320]

Substantial contributions were made towards the identification of critical features of water treaties (also referred to as *treaty mechanisms*) whose inclusion in treaties on shared water resources made theses ones to be flexible and resilient vis-à-vis the impact of climate change on water resources. Such mechanisms are crucial contribution towards treaty flexibility with regard to the unpredictable character of climate change impacts on water resources. Furthemore, these inbuilt flexibility mechanisms work both to improve water treaty design, and offer the basic features that allow treaty assessment regarding the integration of the climate change dimension.

Based on the works of Drieschova *et al.*, and Drieschova & Fischhendler,[1321] Sanchez & Roberts identified four broad-based strategies that assess environmental uncertainties in general, and more specifically the climate-related uncertainties. These four strategies include *i.* ignoring uncertainty; *ii.* a complete contracts approach; *iii.* an uncertainty minimisation strategy, and *iv.* an open-ended strategy. [1322]

[1317] For early analysis on this issue, see generally G. P.H. Gleick 'Water and conflict' (1993) *Int'l Sec* 18 (1), 79–112; P.H. Gleick 'How much water is there and whose is it? In: *The World's Water 2000–2001: The Biennial Report* 9 *on Freshwater Resources*. Washington, DC: Island Press; P. Wouters 'Dynamic Cooperation'—The Evolution of Transboundary Water Cooperation' *in* M. Kidd *et al.* (Eds.) *Water and the Law: Towards Sustainability* (2014) 13, 63.

[1318] Bates *et al.* (note 3 above; 3).

[1319] Wouters (note 1320 above; 63).

[1320] Bakker & Duncan (note 33 above; 424).

[1321] A. Drieschova *et al.* 'Role of Uncertainties in the Design of International Water Treaties: An Historical Perspective' (2011) *CC* 105, 387-408; A. Drieschova & I. Fischhendler 'A Toolkit of Mechanisms to Reduce Uncertainty in International Water Treaties' (2011) *The Hebrew University of Jerusalem*; Sanchez & Roberts (note 9 above, 53).

[1322] Sanchez & Roberts (note 9 above, 53).

The ignorance of uncertainties occurs when parties purposely or instinctively deny the existence of uncertainties. Parties may do so whether because of a tradition of "risk denial",[1323] or if the treaty negotiators deliberately deny the potential presence of uncertainties, for the purpose of selling an agreement to the domestic constituencies. Under the strategy of complete contracts approach, a treaty will specify the obligations of each signing riparian state, under all potential scenarios, thus leaving no room for any ambiguity in treaty implementation or interpretation.[1324] The uncertainty minimisation strategy leads the parties to a treaty to seek cooperation with each other to reduce either the impacts of a considered uncertainty, or its primary causes.[1325] An open-ended strategy leaves enough room for adjustments through the development of intrinsically flexible treaty mechanisms that are likely to be adapted to a wide variety of situations. [1326]

Rieu-Clarke & Moynihan[1327] also proposed a strategy for dealing with uncertainties in water treaties. However, Rieu-Clarke & Moynihan's approach leaned more on water allocation flexible mechanismes than on other aspects of sharing transboundary water resources. Owing to that, Rieu-Clarke & Moynihan's approach will not be very useful to this study given the particular context of the Congo River basin. As mentioned earlier, in general, water allocation does not constitute a concern for the riparian states of water rich river basins such as the Congo River basin.

In support to the 2015 Sendai Framework for Disaster Risk Reduction for the period 2015–2030, the UNECE launched some guidelines for addressing water-related disasters and transboundary cooperation.[1328] The purpose of the guidelines was to propose

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[1323] N.W. Adger *et al*. 'Are there Social Limits to Adaptation to Climate Change?' (2009) *Climatic Change* 93, 339.

[1324] Sanchez & Roberts (note 9 above, 53).

[1325] *Ibid*.

[1326] *Ibid*.

[1327] A. Rieu-Clarke & R. Moynihan *Transboundary water governance and climate change adaptation: International law, policy guidelines and best practice application*. (2015), 32.

[1328] The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted in 2015 by the member States of the United Nations. Its objective is to reduce and to prevent disaster risk and losses that are related to lives and livelihoods, economic losses, as well as damage to infrastructures. To achieve its objective, the Sendai Framework for Disaster Risk Reduction counts on greater understanding of disaster risk across the

a set of principles and guidance for countries implementing the 2015 Sendai Framework, and to help those implementing the 1992 UNECE Watercourses Convention with regard to disaster risk management in transboundary contexts.[1329] While the UNECE guidelines adopted a wholistic approach in addressing the management of water-related disasters, it generally lacked a focus on the features of water treaties for climate change adaptation.

Fischendler[1330] and McCaffrey,[1331] also made significant contributions in the same sense. However, it was the work of Cooley & Gleick[1332] (refered to as *Cooley & Gleick's criteria framework*) that brought in a more coherent set of criteria for the assessment of the extent to which a treaty on transboundary water resources has integrated the climate change dimension. *Cooley & Gleick's criteria framework* is therefore the assessment tool which will be used in this study. Table 12 below gives a summary of the findings of Fischendler, McCaffrey, and Cooley & Gleick.

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globe, which has to come by way of strengthening resilience of people and communities, while focusing on those that are most at risk than others. It also counts on decisive action to be taken by all societies, in order to ensure risk informed development, planning and investments across the planet. See for more details: UNISDR (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. Geneva. Available at *http://www.unisdr.org/we/inform/publications/43291* , accessed on 21 October 2020.

[1329] *Ibid*.

[1330] I. Fischhendler 'Legal and institutional adaptation to climate uncertainty: a study of international rivers' (2004) 4 (6) *Wat Pol* 281, 281-302.

[1331] McCaffrey (f) (note 1318 above; 156-162).

[1332] Gleick (note 345 abovee; 711-718).

Table 12: Criteria frameworks for climate-proofing transboundary water treaties

Fischendler, McCaffrey Criteria	Cooley & Gleick's criteria framework
Flexible allocation strategies	Flexible water allocation strategies and water quality standards
Drought provisions	Response strategy for extreme events
Amendment and review process	Amendment and review process
Joint management institutions	Joint institutions

Source: A compilation from Fischendler (2004), McCaffrey (2003) and Cooley & Gleick (2011)[1333]

The first one to propose a flexibility mechanism for transboundary water treaty responsiveness to climate change was Fischendler & McCaffrey.[1334] Yet, the fourfold treaty mechanism Fischendler & McCaffrey proposed was mostly oriented towards water scarcity. In other words, the two authors saw treaties adaptation to climate change, mainly from a water scarcity perspective. As noticed by Cooley & Gleick,[1335] who were inspired by the work of Fischendler & McCaffrey, these two authors failed to take into consideration the other series of impacts that climate change may have on shared water resources, including floods and water quality concerns. Due to the fact that this thesis focuses on floods rather than droughts or other climate change impacts, as stated earlier,[1336] the observed gaps in Fischendler and McCaffrey's methods make these ones less suitable for this thesis.

To expand the scope of the work of Fischendler and McCaffrey, Colley & Gleick developed a more appropriate framework, which included other potential impacts of climate change on shared waters such as floods. Colley & Gleick's approach is also a fourfold criteria framework. It aims to check in transboundary water treaties the existence of *i)* flexible water allocation strategies and water quality standards; *ii)* Response strategy

[1333] I. Fischhendler 'Legal and institutional adaptation to climate uncertainty: a study of international rivers' (2004) 6 (4) *Water Policy* 281-302; McCaffrey (f) (note 1318 above); and Cooley & Gleick (note 352 above).

[1334] *Ibid*.

[1335] *Ibid*.

[1336] See sections 1.2, 1.3. and 1.4 above.

for extreme events; *iii)* Amendment and review process; *iv)* Joint institutions.[1337] Colley & Gleick's framework criteria will be the framework of reference, which this thesis will use in assessing the inclusion of climate change in the legal regime that governs the waters of the Congo River and its transboundary tributaries.

7.1.2 Flexible water allocation strategies and water quality standards

Water allocation is defined as "the process of distributing water supplies to meet the various requirements of a community".[1338] When applied to shared water resources at the transboundary level, water allocation can be understood as "the process of allocating water supplies to meet the needs and requirements of the different riparian states". Hamner & Wolf[1339] noticed that few treaties addressed water allocation, and attributed such gap to the intensely political nature of water allocation between the states. Both authors further noticed that among the treaties that provided for water allocation, one out of four required equal allocations among the riparian states, whereas the remaining three allotted to each riparian variable amounts of water. Fixed water allocations methods do not provide the needed flexibility that is required in order to adapt to changing climatic conditions.[1340]

One of the most applied methods to ensure treaty flexibility concerning water allocation is to negotiate an agreement that will remain general. In other words, the agreement for water allocation has to remain a "framework" agreement and will comprise a provision requiring the parties to the treaty to meet periodically and conclude protocols concerning the use and management of the shared water resource.[1341] Such proposed periodicity to the meeting supposes that the parties will have gathered enough updated information on the condition and context of the shared waters, which will make them more likely to adjust the sharing mechanisms in place.

An example of treaty practice that has applied this method is the agreement between the governments of the Republics of Kazakhstan, the Kyrgyz, and Uzbekistan,

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[1337] Cooley & Gleick (note 352 above; 714-715).

[1338] See 'Water allocation' at *https://www.encyclopedia.com/environment/encyclopedias-almanacs-transcripts-and-maps/water-allocation* , accessed on 17 July 2019.

[1339] Hamner & Wolf (note 341 above; 162).

[1340] McCaffrey (f) (note 1318 above; 156-162).

[1341] *Ibid*.

which was signed on March 17, 1998, on the Use of Water and Energy Resources of the Syr Darya basin.[1342] Article 2 of this agreement establishes a practice of signing annual agreements on a range of issues regarding the shared water resource.[1343]

In certain circumstances, a treaty may specify that upstream riparian states have to deliver a minimum flow of water to the downstream states. It may also allocate water between riparian countries, based on a percentage of the available water flow. These methods help both upstream and downstream riparian states to access sufficient available water flows, whether in wet or drier circumstances. The only constraint perhaps would be that the method requires flexible infrastructures, reliable and effective operating rules that are rigorously observed by states, with data being regularly communicated among the parties of the treaty.[1344]

Apart from water quantity issues, water quality concerns are also part of the negative impact that climate change may cause water resources in transboundary contexts. Water treaties have to adopt different mechanisms to address climate change impact on water quality. In the 1950s and the 1960s, for instance, Mexican farmers suffered because of omitting provisions regarding water quality in a water treaty that was signed between Mexico and the USA concerning the Colorado River. What happened is that the Colorado River became increasingly saline because of significant pollution from the American side. On the Mexican side, the pollution of the Colorado River resulted in the production of impaired crops. Because the original treaty failed to include issues regarding water quality, there was a need for extensive negotiations after that, which eventually resulted in the

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[1342] The precedent for this approach is provided by states practice under the "*Agreement of March 17, 1998 Between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin";* Article II of this agreement provides: "to ensure the agreed-upon operating regimes of the hydro technical facilities and the reservoirs of the Naryn-Syr Darya Cascade and irrigation water releases, the parties deem it necessary annually to coordinate and make decisions on water releases, production and transit of electricity, and compensations for energy losses, on an equivalent basis." The Syr Darya Basin Agreement of March 17, 1998, available at *http://www.fao.org/faolex/results/details/en/c/LEX-FAOC054530/,* accessed on 12 July 2019.

[1343] Agreement available at *http://www.cawater-info.net/library/eng/l/syrdarya_water_energy.pdf* , accessed on 12 July 2019.

[1344] Cooley & Gleick (note 352 above; 715).

amendment of the treaty several times.[1345] The new treaty enjoined the USA to deliver water to Mexico within the limits of certain salinity thresholds.[1346]

In addressing climate change impact on water quality, different treaty mechanisms might be put in place, depending on the context and the effect that has occurred. For instance, sea-level rise and lower flow rate of a shared watercourse may intensify the intrusion of saltwater in deltas and affect the downstream country whose territory is situated at the delta of the transboundary watercourse.[1347] A treaty that addresses water quality in such cases will differ from the one that addresses water quality because of industrial pollution upstream, for instance.

Besides, there is also a possibility of water quality decline due to various factors, including nutrients pollution, surface water pollution, oxygen depletion, groundwater pollution, and the pollution of shared waters from some industrial origins.[1348] Such a situation may originate from upstream sources and cause damages downstream. More awareness is needed at riparian states level regarding the extent to which climate change will affect water quality in transboundary contexts.[1349] States awareness will contribute to the inclusion of quality issues in water treaties. The implementation of the 1992 UNECE watercourses treaty has made a significant contribution to improving its state parties' awareness on issues regarding the quality of transboundary water resources.[1350]

One of the limitations of these authors' framework with regard to this particular criterion is that this one fails to consider the fact that the allocation of water

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[1345] Hundley *Dividing the Water: A Century of Controversy between the United States and Mexico* (1966).

[1346] *Ibid*.; Cooley & Gleick (note 352 above; 713).

[1347] *Ibid*. at 715.

[1348] For details on the types of water pollution see generally D. Melissa 'water pollution, everything you need to know', available at *https://www.nrdc.org/stories/water-pollution-everything-you-need-know* accessed on 17 July 2019; R. Helmer & I. Hespanhol *Water pollution control: a guide to the use of water quality management principles* (1997); see also WWF on *water pollution* , available at *https://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/water_pollution/*; accessed on 17 July 2019.

[1349] See section 2.2.6 above.

[1350] See section 8.3.4 below concerning the UNECE regime regarding flood management.

resources becomes a concern for riparian countries only under certain circumstances.[1351] For instance, in contexts marked with water competition, while the resource seems not enough to supply all the needs and demands of the riparian, water allocation then becomes necessary, to ensure fair access to all the riparian. In water-rich contexts, or in non-urban setups, treaties practice has shown little need for defining water allocations.[1352] The Treaty between Canada and the USA of January 17, 1961, relating to cooperative development of the water resources of the Columbia River basin, refrained even from defining any mechanism of water allocation between the two signatories, except for some reasons including power generation and floods control.[1353]

7.1.3 Response strategy for extreme weather events

The third method to create flexibility in water treaties is to reserve special provisions for unusual circumstances, such as droughts and floods. The IPCC defines an extreme weather event as "an event that is rare at a particular place and time of year".[1354] By definition, the features of what can qualify as extreme weather events may, in an absolute sense, vary from one context to the other. Depending on circumstances, droughts and floods can qualify as extreme weather events, as it will be seen in details in the next chapter of this thesis.[1355]

Much of the consulted literature that addressed the issue of transboundary treaties and climate change emphasised on aspects other than floods. Also, treaties, guidelines, and other legal arrangements concerning transboundary water resources often ignored flood issues, apart from some rare instrument such as the "guidelines on sustainable flood prevention", which was adopted by the UNECE, as early as in the year 2000, which

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[1351] P. Woodhouse & M. Muller 'Water governance—An historical perspective on current debates' (2017) 92 *Wor Dev* 225, 229; D.E. Garrick *Water allocation in rivers under pressure: Water trading, transaction costs and transboundary governance in the Western US and Australia* (2015), 1-2;, J.C. Neuman Drought Proofing Water Law (2003) *U. Denv. Water L. Rev. 7*, 92; A. Miller *et al.* 'Water allocation in a changing climate: institutions and adaptation' (1997) 2 (35) *Cl Ch* 157, 158-159.

[1352] *Ibid*. Woodhouse & Muller; *Ibid*. Garrick.

[1353] See article IV of the Treaty between Canada and the United States of America relating to Cooperative Development of the Water Resources of The Columbia River Basin of January 17, 1961, treaty available at *http://extwprlegs1.fao.org/docs/pdf/bi-145062.pdf* , accessed on 18 May 2019.

[1354] IPCC, 2014 (c) (note 10 above; 1765).

[1355] See section 8.2 below.

already considered the impact of climate change on rivers run-off.[1356] The UNECE then invited the Parties and non-Parties to the Convention to apply its guidelines on sustainable flood prevention for the management of their transboundary water resources, in accordance with their own national contexts, as far as appropriate. Sections 17 and 18 of the guidelines, for instance, stipulates the following:

> "Dams, flood ways, dykes and other flood-control works, hydraulic structures and other water-construction works should be built, maintained and rehabilitated to ensure that they are safe and provide a sufficient level of flood protection, in keeping with applicable construction standards or the best available technology and taking into consideration, in particular, the impact of climate change on river run-off. 18. However, flood protection is never absolute; only a certain level of protection against flooding can be guaranteed. The concept of residual risk should therefore be explained to the public."[1357]

With the advent of climate change and its predicted impacts in terms of wet places being wetter and dry places being dryer, floods will become a major threat, especially in downstream riparian states during wet seasons.[1358]

Apart from the UNECE's global network of basins which was mentioned earlier,[1359] the World Meteorological Organisation and the Global Water Partnership also set in place a flood based programme, refered to as the Associated flood management Programme.[1360] Its aims is to promote the concept of Integrated Flood Management (IFM) as the new approach to flood Management at a global scale.[1361] Mechanisms that are put in

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[1356] See for more details the UNECE *Guidelines on Sustainable Flood Prevention* (2000), available at: *https://www.unece.org/index.php?id=12617* , accessed on 15 November 2020.

[1357] Sections 17 and 18 of the UNECE guidelines on sustainable flood prevention.

[1358] See chapter 8 for details on floods; Cooley & Gleick (note 352 above; 717).

[1359] See section 6.3.1 above.

[1360] http://apfm.info/pdf/concept_paper_e.pdf, accessed on 18 May 2019.

[1361] See for further details WMO & GWP *The Legal and Institutional Aspects of Integrated Flood Management* (2006), available at: *https://library.wmo.int/index.php?lvl=notice_display&id=7135#.X6w8wlBS-00 , accessed on 15 November 2020.*

place by the IFM minimise losses of life from flooding, increase resilience in flood affected areas and communities, while maximising the efficient use of flood-prone areas.

There are generally two ways of protecting vulnerable flood-prone zones from floods. The first is to control flood from where it has the potential to form, and the second is to control it by using structural measures around the flood-prone zones, which are locations where floods are likely to cause the most damages.[1362] There are three types of structural apparatus that are involved in flood prevention and control. These include the development of some structural measures such as the building of dams and water reservoirs, the erection of levees and floodwalls, and the channelisation of the waterway.[1363] For all these flood control strategies, problems do not arise when these structures are to be erected within the territory of the country that is threatened by the flood. The issue becomes complex when the measures for flood prevention or flood control are to be implemented in a preventive way within the territory of another riparian state upstream of the flood-prone zone.

What generally reduces the risks that are associated with floods at river basin level is the establishment of coordinated flood management strategies. The example of a treaty that has applied this method is the 1961 Columbia River basin treaty, which provides that Canada (which is the upstream state in the treaty) would adjust operation in its hydroelectric dams in order to mitigate flooding on the US side. The agreement on the cooperation for sustainable development of the Mekong River basin also offers a similar example, as it sets a maximum river flow rate that the upstream dam operations have to adjust to, in order to meet the treaty's standards.[1364] However, as Cooley[1365] acknowledges, the coordination of flood-management initiatives at river basin level is crucial, as he

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[1362] World Bank Group *Implementing naturebased flood protection Principles and implementation guidance* (2017); P. Sayers et al. 'Strategic flood management: ten 'golden rules' to guide a sound approach' (2015) 2 (13) *Int'l J of Riv B Mngmnt* 137; T. Tingsanchali 'Urban flood disaster management' (2011) 32 *Proc eng* 25, 25-37; GIZ *Flood Control Measures, Best Practices Report* (2000).

[1363] *Ibid*. Tingsanchali; *Ibid*. Sayers.

[1364] See Article 6 and 26 of the Agreement on the Cooperation for Sustainable Development of the Mekong River Basin available at *http://www.mrcmekong.org/assets/Publications/policies/agreement-Apr95.pdf* , accessed on 19 July 2019.

[1365] Cooley & Gleick (note 352 above; 716).

recommends the adoption of flood-management protocols to the agreements signed on transboundary water resources, with the view of adopting useful flood risk-mitigation tools.

Although they are of little interest in the present research, droughts are the most typical extreme weather events that are dealt with by transboundary water treaties. The 1944 treaty concerning the Colorado River and the Rio Grande, for instance, that was signed between the US and Mexico, made a special provision for problems that could result from droughts. Article 4(B)(d) of that treaty provides that the US is entitled to receive specific quantities of water from the Mexican counterpart, which are estimated on annual average during cycles of five-years.[1366] If then, an *extraordinary drought* causes deficiencies in water supply, Mexico is committed to increasing the amount of water delivered to the US during the following cycle of five-years.[1367] In the Nile River basin, there is a "Permanent Joint Technical Commission" that can make recommendations regarding new approaches to re-organise water allocation among the interested parties of the basin, in reaction to an extraordinary drought that the Nile River could suffer from.[1368]

7.1.4 Treaty amendment and review process

Article 40 of the 1969 Vienna Convention on the law of the treaties refers to the term "amendment" as a formal alteration of one or more provisions of a treaty, which affects all its parties.[1369] The amendment of a treaty has to follow the same formalities that resulted in its original adoption and requires the consent of all the parties to the treaty.[1370] Even if treaties have a reputation of being rigid to amendment or review, their amendment can be made smoother by incorporating in the body of the treaty a provision for a relaxed treaty amendment. The qualifier "built-in mechanisms" is sometimes used in this case, to signify amendment mechanisms that are incorporated in the body of a treaty from the time the treaty is initially adopted. Climate-proofing water treaties require the incorporation of such

[1366] McCaffrey (f) (note 1318 above; 156-162).

[1367] *Ibid*.

[1368] *Ibid*.

[1369] See Article 40 of the Vienna Convention of the Law of Treaties 1969.

[1370] *Ibid*.

built-in treaty amendment mechanisms because these mechanisms offer to the parties to the treaty enough flexibility for their adaptation to changing climatic conditions.

In the case of unforeseen or unpredicted events which may cause asymmetric harm to part of the signatories of a treaty and spare the others, a water treaty that lacks a built-in flexibility mechanism for the amendment of the treaty will push the harmed state either to deviate from its treaty commitments or to withdraw from the treaty. For such a harmed party, keeping its commitments under the treaty may become unbearable following the unforeseen event.[1371] The flood regime across the European Union offers one of the best examples in terms of built-in flexibility mechanism.[1372]

Another way of facilitating treaty amendment and review process is that the riparian states may give to the treaty they sign a short life; to such a short life, parties will annex a provision for tacit renewals of the treaty after a fixed period, unless there comes an objection from one or more parties to suspend the execution of the obligations under the treaty for a specified period of time, because of some unforeseen circumstances. In this way, the parties to the treaty have enough liberty and flexibility to adapt to changing conditions and thus spare the treaty. Any significant issue around the shared water resources, therefore, including the unbearable consequences of climate change on one of the signatories of the treaty, can become the object of new discussions between the treaty parties, and from there, become the basis for the amendment of the treaty.[1373]

The example of treaty practice that applies this technique comes from the Syr Darya River basin.[1374] Article 12 of the Syr Darya basin treaty permits a state that is adversely impacted by changed circumstances to withdraw momentarily from the treaty.[1375]

[1371] McCaffrey (f) (note 1318 above; 156-162).

[1372] See section 8.3.5 below.

[1373] McCaffrey (f) (note 1318 above; 156-162).

[1374] See the "Agreement between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin of March 17, 1998" available at *http://www.cawater-info.net/library/eng/l/syrdarya_water_energy.pdf* , accessed on 2 June 2019.

[1375] Aricle 12 of the Syr Darya Agreement of 1998 provides: "This agreement is valid for a period of five years and will be automatically renewed for additional five-year periods, if no written notice on the

Such withdrawal frees the withdrawn state from the oppressive condition in which the state could be in if it had to stay in the treaty despite the changing conditions on the waters and their unpredicted consequences on the state.

The latter approach to which this thesis will refer is the inclusion in a water treaty of provisions that allow any party to terminate the agreement unilaterally. The party that thus terminates the agreement will have to do so following some procedures such as the observance of a period of notice before the termination of the treaty takes effect. Since States cannot at the time of signing water treaties foresee all possible negative impacts of climate change on the shared waters, a treaty provision that grants the right to terminate the treaty unilaterally would confer to them some protection against the adverse effects of any unexpected phenomenon.[1376]

Even though some states have successfully applied this method in water treaties, for McCaffrey,[1377] the method can be inappropriate in some cases. That is why it seems recommendable that the States that recourse to this method could incorporate in the treaty some accompanying measures aimed at avoiding eventual unlawful conduct by some parties. The treaty between Hungary and Czechoslovakia, which was at the origin of the *Gabcíkovo* case, and which established joint operations for construction works on the shared watercourse between the two signatory states, is seen as an excellent illustration of the inappropriateness of this method.[1378]

In the *Gabcíkovo* case, a provision for unilateral termination of the treaty was incorporated in the treaty between Hungary and Czechoslovakia, which was referred to by Hungary to terminate the treaty, yet in a manner that was later condemned by the ICJ. The ICJ did not accept Hungary's argument because its unilateral termination of the treaty did not reflect the spirit of the treaty, caused a prejudiced the other party, and thus triggered a dispute outbreak between the parties.[1379]

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termination of the agreement is given six months in advance from any Party." See Syr Darya Agreement, note 1326 above.

[1376] McCaffrey (f) (note 1318 above; 156-162).

[1377] *Ibid.*

[1378] See section 3.5.5 above. For further details on the *Gabčíkovo-Nagymaros* case, see note 663 above.

[1379] *Ibid.*

Conversely to the Hungarian and Czechoslovakian Treaty, which was focused on construction works, an agreement on water allocation, for instance, which is deprived of any engagements towards permanent joint structures on a shared watercourse, could accommodate a termination provision adequately.[1380] In the case of an agreement on water allocation, a unilateral termination may not have as much material, financial, or human consequences as it can be the case with an agreement which is based on works on the waterway.

7.1.5 Joint institutions

The fourth method for integrating climate change considerations into treaties on shared water resources is to establish joint institutions for water management. Institutions are generally defined as 'established official organisations that have an important role in society.'[1381] A joint institution that involves all the riparian states of a watercourse can fulfil different roles, including the facilitation of climate change adaptation. Because of the natural hydrologic unity of water resources that flow through a river basin, adequate management of transboundary water resources requires the establishment of joint institutions that involve ideally all its riparian states.[1382] The establishment of this kind of institutions that would take parts of the prerogatives of the states over their shared water resources is often perceived as a threat for many riparian states.[1383] These states often prefer managing their natural resources, including waters on a state-to-state basis, without the interference of any supra-national institution.[1384]

A key consideration, however, is to set in place appropriate institutional structures and legal arrangements that may approach the shared water resources for the maximum benefit of all the riparian states and the preservation and sustainable development of the resources of the said states.[1385] Joint institutions such as river basin organisations or even the sub-institutions that a river basin organisation may help establish,

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[1380] McCaffrey (f) (note 1318 above; 156-162).

[1381] Institution *https://www.lexico.com/en/definition/institution* , accessed on 25 June 2019.

[1382] See section 4.3.4 above on discussions regarding the principle of Cooperation in transboundary contexts.

[1383] *Ibid*.

[1384] *Ibid*. See also Allouche (note 370 above; 33-36); McCaffrey (f) (note 1318 above; 157-159).

[1385] Rieu-Clarke & R. Moynihan (note 1330 above; 26).

constitute an appropriate answer to the negative impact of climate change. The joint institutions that are in charge of the planning and execution of functions regarding specific projects on common waters may assist in the adoption of flexible responses as the needs may arise in case of changes in the hydrologic conditions of the shared watercourse. The example here comes from the 1977 agreement concerning mutual assistance in the construction of the Gabcikovo-Nagymaros system, whose Article 15 regarding the Protection of Water quality on the Danube River provides:

> "The Contracting Parties shall ensure, by the means specified in the joint contractual plan, that the quality of the water in the Danube is not impaired as a result of the construction and operation of the System of Locks."[1386]

The legal empowerment of joint institutional mechanisms or bodies is crucial. McCaffrey[1387] claims that legal empowerment allows joint institutions either to make the necessary adjustments in a treaty regime or to recommend to the treaty parties to undertake the necessary steps for treaty adjustments.

In that sense, the legal empowerment of the joint institutional mechanism also offers excellent flexibility for adapting to changing conditions, including from climatic stressors. A joint technical body may, in some cases, develop a standard hydrological model for the shared basin and regularly make available some local climate-change scenarios for the riparian states.[1388] In many respects, information, as harmonised and shared as those generated by the joint institutions, is highly contributive to adapting to climate change at the river basin level.

The International Commission on the Protection of the Rhine (ICPR), for instance, launched in 2009 the assessment of the state of knowledge regarding climate change and its predicted impacts on the regime of the waters of the Rhine. The results of the study have proven to be very useful to the riparian states of the basin and have

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[1386] Articles 15(1) and 19 of the agreement concerning mutual assistance in the construction of the Gabcikovo-Nagymaros system of locks (with schedule). Signed at Budapest on 16 September 1977, Available at *https://treaties.un.org/doc/Publication/UNTS/Volume%201724/volume-1724-I-30074-English.pdf*, accessed on 10 July 2019.

[1387] McCaffrey (f) (note 1318 above; 162-160).

[1388] Cooley & Gleick (note 352 above; 717).

significantly contributed to the fulfilment of the obligation to share water-related information among the states of the basin. A second example to provide here is the Great Lake Commission, including the two riparian states, namely the USA and Canada, which commissioned in 2018 an assessment of the impact of climate change on the great lakes for the benefit of both countries.[1389]

7.2 Conclusion

Chapter 7 has introduced a criteria framework for climate change-related treaty assessment, in order to equip this thesis with the necessary tool to enable the assessment of the regime that governs the Congo River and its transboundary tributaries concerning its integration of the climate change dimension. Among the tools that exist, such as the one proposed by Fischendler and McCaffrey, Cooley & Gleick's is adopted by this thesis because it also assesses a treaty's responsiveness to extreme events, unlike the Fischendler and McCaffrey's tools. *Cooley & Gleick's* tool verifies in transboundary water treaties the inclusion of *i)* adjustable allocation strategies and water-quality standards; *ii)* response strategies for extreme events; *iii)* amendment and review procedures; and at last, *iv)* joint management institutions. This thesis required a tool such as *Cooley & Gleick's criteria framework* because the predictions concerning climate change's impacts state that there is a strong likelihood of periodic floods to be shortly occurring across the Congo River basin. After equipping this thesis with a tool that comprises a set of criteria that will be referred to for treaty assessment regarding the inclusion of the climate change dimension, the next chapter will focus on a few case studies of flood-management regimes, to illustrate the adequate manner through which a legal regime may address specific adverse impact of climate change on shared water resources such as floods. The integration of the climate change dimension in a treaty is a necessary but not sufficient condition to ensure that the impacts of climate change are dealt with at the river basin scale. Event though the integration of the climate change dimension in a treaty ensures a treaty's flexibility and stability in the face of changing climatic conditions, the predictions regarding the specific impact of climate change on a given river basin, such

[1389] ICPR *Analysis of the state of knowledge on climate changes so far and on the impact of the phenomenon on the water regime in the Rhine watershed: Literature Evaluation*. Report no. 174 (2009), 23. Available at *http://www.iksr.org/uploads/media/Bericht_174_e.pdf* , accessed on 10 July 2019.

as floods, will need to be addressed accordingly, in order to obtain a maximal response and ensure an adequate protection from the impacts of climate change on the basin’s waters.

8 FLOOD MANAGEMENT REGIMES: CASE STUDIES

8.1 Introduction

The previous chapter has considered *Cooley & Gleick's criteria framework* for the assessment of the responsiveness of transboundary water treaties to the climate change phenomenon. This chapter sets out to study a few selected flood management regimes across the globe, including the flood management regimes that are in place in the Rhine and the Danube Rivers. This chapter aims to discover the extent to which the legal frameworks that govern transboundary watercourse treaties in the selected river basins have addressed the impact of climate change on the shared water resources. The motivations behind the case studies that are undertaken in this chapter are threefold: *firstly,* the finding that the inclusion of climate change in a water treaty is a necessary but not a sufficient condition for regime's responsiveness to climate change. A mere mention of climate change in a water treaty will have little impact if it is not completed with further steps that specifically address the predicted impact of climate change, whether it is floods (as is the case in the Congo River basin), or droughts. *Secondly*, the Rhine and Danube River basins share strong similarities with the Congo River basin concerning the likelihood of floods because of climate change.[1390] *Thirdly,* these two rivers have adequately put in place a flood management regime, which may contribute to the development of an adequate flood management regime in the Congo River basin. *Fourthly*, the Danube River basin case study indicates that while providing the necessary flood protection to a flood-prone area, adequate flood management infrastructures can gather significant amounts of extra waters that can be diverted to or transferred elsewhere. This chapter will firstly discuss the flood management regime which is in place in the Rhine River basin and after that, and secondly, explore the Danube-Main-Rhine interbasin water transfer scheme that transfers excessive waters from a flood-prone area located in the Danube River basin into a water-imbalanced area which is located in the Rhine River basin. A short conclusion will then close this chapter's discussions.

[1390] See further details, including details on the sources in section 8.3.4.2 below.

8.2 Generalities on floods

8.2.1 Definition

Flood is a natural phenomenon, and it usually happens on a seasonal basis, with varying intensity. Flood is generally defined as "The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas not normally submerged."[1391] The International Commission on Irrigation and Drainage (ICID)[1392] defines a flood as "A relatively high flow or stage in a river, which is markedly higher than the usual; also the inundation of low land that may result from there. It is a body of water, rising, swelling, and overflowing the land not usually thus covered." Experts have identified different types of floods, including river (fluvial) floods, coastal floods, flash floods, pluvial floods, urban floods, sewer floods, and glacial lake outburst floods.[1393]

8.2.2 Issues, Impacts, and facts about floods

Flood is a well-known phenomenon in most societies. Over the centuries, floods have caused several damages, including fatalities, famines, and atrocious suffering of men and their properties. Some of the consequences of floods were cataclysmic.[1394] The biblical account of the genesis reports the destruction of a civilisation referred to as antediluvian, from which only one man and his family were divinely preserved: Noah.[1395] Some observers have reported that the year 2018 was exceptional in terms of extreme events,

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[1391] IPCC (2014) (c) (note 10 above; 1765).

[1392] definition available at *https://www.icid.org/members_only/icidmtd/view.php?type=latest&lang=en&references=&kwid=4103*, accessed on 30 August 2019; The ICID is a non-for-profit organisation that was established in 1950 as a professional network of worldwide experts in the field of irrigation, drainage, and flood management. The organisation aims at promoting 'Sustainable agriculture water management' in order to achieve a 'Water secure world that is free of poverty and hunger, through sustainable rural development'. See for more details: *https://www.icid.org/members_only/icidmtd/view.php?type=latest&lang=en&references=&kwid=4103*, accessed on 30 August 2019.

[1393] IPCC (2014) (c) (note 10 above; 1765).

[1394] *Ibid*.

[1395] W. Ryan & W. Pitman *Noah's Flood: The new scientific discoveries about the event that changed history* (2000); see also Genesis chapters 6 and 7 of the Holy Bible for a tale of the story of Noah.

including floods.[1396] The UN predicts that by 2050, there will be worldwide around two billion people who will be vulnerable to floods,[1397] as a result of several climate change-related factors, including the rising of sea levels and the demographic expansion in flood-prone areas.

Contrary to situations where there are some levels of preparation, flood damages tend to be intense when people and societies are found unprepared.[1398] There are many examples of high fatalities that are associated with lack of adequate preparation for floods. In 1824, for instance, a flood took Russia by surprise and killed 200 to 600 thousand people in the city of St. Petersburg.[1399] The St. Petersburg's flood occurred as a result of several days of rain, which caused the rising of the levels of the waters in the Neva River by about 4 meters. More than 325 major river floods are reported to have occurred in Europe alone, from 1980 to date,[1400] with the majority of them taking place after the year 2000.

However, with floods, things are not always negative; floods can sometimes turn out to be positive and beneficial,[1401] especially if a flood is manageable.

[1396] J. Morrison 'Flooding Hot Spots: Why seas are rising faster on the U.S. east coast' (2018) *Yale Env 360*. Available at *https://e360.yale.edu/features/flooding-hot-spots-why-seas-are-rising-faster-on-the-u.s.-east-coast*, accessed on 14 April 2019; World Economic Forum 'The Global Risks Report 2019' 14th Ed. (2019), 15.

[1397] UNU 'Two Billion People Vulnerable to Floods by 2050' (Press Release, June 13, 2004), available at *http://www.unu.edu/news/ehs/floods.doc*, accessed on 07 July 2019. Deforestation and demographic expansion in flood-prone regions are other factors that exacerbate communities vulnerability to floods.

[1398] WBG *Assessing socioeconomic resilience to floods in 90 countries* (2016); USAID *Global Climate Change, Adaptation, And Infrastructure Issues Knowledge Management Support* (2015), 1; Sayers *et al.* (note 1368 above; 137); Tingsanchali (note 1368 above; 1-2); 25-37.

[1399] Nick Paton Walsh 'St Petersburg races to halt floods' available at *https://www.theguardian.com/world/2003/jul/29/russia.nickpatonwalsh* , accessed on 13 June 2019.

[1400] EEA *Climate change, impacts and vulnerability in Europe 2012 – An indicator-based report* (2012), 112-127 & 213-216. Available at *file:///C:/Users/213570379/Downloads/Climate%20change-%20impacts%20and%20vulnerability%20in%20Europe%202012%20-%20Summary.pdf* , accessed on 07 July 2019.

[1401] *See generally A.* Murray Natural Flood Management, Adopting eco system approaches to managing flood risk (2017) *Fr of the Ear;* L. Alfieri *et al*. 'Increasing flood risk under climate change: a pan-European assessment of the benefits of four adaptation strategies' (2016) 3-4 (136) *Clim Ch* 507, 508; B. Jongman *et al.* 'Declining vulnerability to river floods and the global benefits of adaptation' (2015) 18 (112) *Proc of the Nat Ac of Sc* 2271, 2272.

A recent study has found out that there was annually a loss of 60-70 million US dollars because of flood damages, against 8 to 10 billion dollars of possible benefits from flood control. For instance, floods can mean significant economic opportunities, or environmental and social benefits are often unnoticed.[1402] Floodwaters can be harvested and stored to serve for irrigation purposes later. Excessive waters inflowing during a wet season can be stored to compensate for a dryer season.[1403] There are several examples of flood control across the globe that are made for this purpose.[1404]

There are generally two ways of organising the protection of vulnerable flood-prone zones. The first is to control the flood from where it has the potential to form, as it was done in the above Turkey and Iraq case. The second way is to control the phenomenon by building structural measures around the flood-prone zones, at places where the flood is likely to cause the most damages.[1405] In order to be effective, some flood measures have to be applied to the possible extent to the entire river basin, through cooperation between upstream and downstream countries. This was the case for the flood management mechanism put in place under the 1949 Treaty of friendship and good neighbourly relations between Turkey and Iraq. Turkey being the upstream riparian, and Iraq being the downstream riparian, the agreement was to build on the Turkey territory some water retention structures that are aimed at protecting Iraq from floods.

As observed by several reports and scholars,[1406] the capability to manage floodwaters will become crucial in many geographical locations because of climate change. This is, as said Colley,[1407] in order to balance the excessive rainfall during the rainy seasons

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[1402] *Ibid*. Alfieri *et al*.

[1403] Le Thi *et al.* 'The Combined Impact on the flooding in Vietnam's Mekong River Delta of Local Man-made Structures, Sea level rise, and Dams Upstream in the River Catchment' (2007) 71 *Est,Coas & Sh Sc* 110, 116.

[1404] For experiences of India, South Africa and Pakistan in this field, see respectively, R.K. Parashar 'Interbasin Water Transfer: Indian Scenario' in *Interbasin Water Transfer, Proceedings of the International Workshop*, Unesco, Paris (1999), 73–80, 61-70, 81-94.

[1405] WBG (note 1404 above; 1); Sayers *et al.* (note 1368 above; 137); Tingsanchali (note 1368 above; 1-2); 25-37.

[1406] See for instance S. Robinson Climate change adaptation trends in small island developing states (2017) 4 (22) *Mit and Ad strat for Gl Ch* 669, 670; Cooley & Gleick (note 352 above; 717).

[1407] *Ibid*. Cooley & Gleick.

and the dryer conditions during the dry season.[1408] Climate change, as discussed above, will cause wet seasons to be wetter and dry seasons to be dryer.

8.3 *Reasons for choosing the Danube and the Rhine River basins*

The reason for choosing the flood management regime which is in place in the Rhine and the Danube River basins is mainly found in the third objective of this thesis.[1409] This study is expected to formulate some relevant recommendations which will aim at improving the legal framework that governs the Congo watercourse for more responsiveness to the predicted impacts of climate change on the waters of the basin, especially the floodings.

While it is true that there are several river basins that are confronted with climate-related seasonal floodings worldwide, floods do not occur everywhere on the globe with similar intensity and frequency. In a transboundary context, flood management measures will be adopted by the concerned states depending on how frequent and severe floods occur. This is the reason why not all the river basins of the world have put in place flood management regimes and measures, to which this thesis could refere for recommendation purpose, as it is the case with the Rhine and the Danube basins. The Mekong River basin, in Asia, or the Senegal in Africa, to name but a few, are all confronted to some extents with climate-related seasonal floodings. Yet, the flood management measures which are in place in those transboundary basins are not as advanced as the ones in place in the Rhine and Danube River basins.

Besides, river basins which are geographically and contextually closer to the Congo River basin, such as the Nile northwards, or the Zambezi southwards, could not be selected as cases to study because they do not share similar climatic previsons with the Congo River basin concerning floods.[1410] In the Nile River basin case, it is predicted a slight increase in the basin's rainfall frequency, along with a temperature rise, yet no significant

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[1408] *Ibid.*

[1409] See Section 1.3 above.

[1410] On the previsions concerning the impacts of climate change on the waters of the Congo, the Nile and the Zambezi River basins, see generally: IPCC (2014) (c) (note 4 above); IPCC (2014) (b) (note 10 above); IPCC (2018) (f) (note 7 above).

increase in the volume of water resources.[1411] Not only that, but water scarcity is expected to be touching 35 percent of the Nile basin population by the year 2040.[1412] Owing to that, the Nile basin states are urged to set in place an equitable water allocation scheme between them, thus showing that flood management does not constitute a future preoccupation for them as it is the case for the states of the Congo basin. Likewise in the Zambezi River basin, even tough made of several high risk flooding areas, flood management has not yet been prioritised, thus giving an indication of the reasons why the legal framework for flood management at basin level has received only little attention.[1413]

As it will be discussed in the next section, the rich flood management history of the Rhine River basin, its climatic previsions on higher risks of floods, the working flood management legal framework of both basins, the successful water transfer mechanism in place in the Danube River basin, to name only these, are all factors that have motivated the consideration of both the Rhine and the Danube River basins as relevant study cases for this thesis.

8.4 Case study 1: Flood management regime of the Rhine River

8.4.1 The Rhine River in Europe

The Rhine River is one of the chief watercourses on the European continent. It ranked third in Europe and ninth in Eurasia.[1414] It is considered to be the most essential economic and cultural axis in Middle Europe.[1415] The Rhine River originates from Switzerland, flows northwards through Germany and the Netherlands, before discharging into the North Sea.

[1411] Information available at: *https://qz.com/africa/1785205/climate-change-is-more-rain-but-less-water-for-river-nile-basin/* accessed on 21 November 2020.

[1412] which represents roughly 80 million individuals. Information available at: *https://qz.com/africa/1785205/climate-change-is-more-rain-but-less-water-for-river-nile-basin/* , accessed on 21 November 2020.

[1413] G.S. Sanchez "the Zambezi River basin : Water resources management" (Unpublished Masters thesis, Stockholm University, 2018), 10.

[1414] Unesco-IHE/WGC 'International cooperation on the River Rhine' available at *https://www.unece.org/fileadmin/DAM/env/water/cadialogue/docs/Almaty_Oct2010/Eng/Hofstra_Eng.pdf*, accessed on 12 July 2019.

[1415] See ICPR (2013) available at *www.iksr.de* , accessed on 14 September 2019.

It is water fed from a transboundary hydrographic basin of approximately 185,260 square kilometres, which includes nine countries, among which are Austria, Belgium, France, Germany, Italy, Liechtenstein, Luxemburg, Netherlands, and Switzerland.[1416] Four of the nine riparians, including France, Germany, Netherlands, and Switzerland, represent 92 percent of the basin's area, whereas the remaining eight percent is shared by the other five countries.[1417] Fifty-eight million people live in the Rhine River basin. [1418] Large European cities such as Rotterdam, Cologne, and Basel are situated on the banks of the Rhine.[1419]

8.4.2 The Rhine River in the history of Europe

The Rhine has been almost omnipresent in the history, politics, economy and culture of Europe over the last 2,000 years. The Rhine River and its tributaries are the primary fluvial axis in the region, which is one of the main economic zones of the European continent.[1420] The massive and stable flows of the Rhine have made possible the quasi-permanent navigation throughout the year on 800 kilometres of its waterway.[1421] Apart from transportation, the services provided by the Rhine include the supply of drinking water, urban sanitation, power generation, industrial production, agriculture and tourism, because of which Cioc[1422] qualified the Rhine River 'as a classic example of a multipurpose' waterway'.

Because of the signing of the 1815 Vienna Treaty and its freedom of navigation, conditions for regional and international trade significantly improved within the Rhine basin. Its riparian countries developed several sectors such as hydropower production, Agriculture, manufacture, pharmaceutical industries, automobile and fishery to name but a few along the bench of the Rhine, from where they traded to all over the world. However, as lamented Friedrich[1423] a few decades ago, all these human activities that are

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[1416] U.F. Uehlinger *et al. The Rhine river basin* (2009), 1.

[1417] *Ibid*. at 39-42.

[1418] Italy for instance has only 51 square kilometres in the basin. reference. See *Ibid*. Uehlinger at 1.

[1419] S.K. Chase 'There Must Be Something in the Water: An Exploration of the Rhine and Mississippi Rivers' Governing Differences and an Argument for Change' (2011) 29 *Wis. Int'l LJ* 609.

[1420] The Region covered by the Basin has a GDP estimated to some 1750 billion of US$. See Uehlinger (note 1422 above; 2).

[1421] I.D. Frijters & J. Leentvaar *Rhine case study* (2003), 15.

[1422] Cioc, M. 2002. The Rhine: an eco-biography, 1815–2000. University of Washington Press, Seattle.

[1423] G. Friedrich & D. M€uller Rhine. Ecology of European Rivers (1984), 265–315.

taking place across the basin for 200 years have severely affected the Rhine's biodiversity and its ecological integrity.

8.4.3 Hydrographical description of the Rhine River and its tributaries

The Rhine River measures about 1,232 kilometres from its source in the Alps to its mouth at the North Sea. It discharges on average 2,300 cubic meters of water per second,[1424] which it receives from approximately 35 tributaries, of which the major are the Aare, Main, Moselle and Neckar Rivers.[1425]

The Aare River is 295 kilometres long. It emanates from Switzerland and has a sub-basin of approximately 17,606 square kilometres. Roughly 2.1 percent of the sub-basin (370 square kilometres) is made of glaciers, while 28 percent are forests, and 36 percent are agricultural lands. Annual averages of precipitation are estimated around 1,490 mm, while the runoff is 1,003 mm. 3.4 million people live in the Aare sub-basin (192 people/square kilometre), most of them in the Swiss landscapes.[1426] The Aare River discharges on average some 559 m^3 of water per second. Industrial activities such as power production and manufacturing, are the main drivers in Aare, whether in quantity or quality terms. Flooding is a phenomenon that has occurred in the densely populated basin for centuries. Predictions say that climate change will exacerbate flooding in the Aare basin, both in terms of frequency and intensity.[1427]

The Neckar River is the second major tributary of the Rhine. It measures 367 kilometres long and originates from the Danube-Rhine zone of the divide at the Schwenninger moss wetland in Germany.[1428] The sub-basin of the Neckar River forms an area of approximately 13, 950 square kilometres, which consists of 53 percent of agricultural lands and 36 percent of forests. The Neckar's annual average of precipitations is around 757 mm, whereas its runoff lays around 337 mm.[1429] Some 5.3 million people

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[1424] Uehlinger (note 1422 above; 1).

[1425] *Ibid*.

[1426] *Ibid*.at 39-42.

[1427] *Ibid*.

[1428] *Ibid*.; Details on Schwenninger moss wetland are available at *https://www.wt-vs.de/en/tourism/leisure-time/nature/schwenninger-moos.html* , accessed on 12 June 2019.

[1429] *Ibid*.

live in the Neckar sub-basin (380 inhabitants/square kilometre), most of which live on the Swiss side. The Neckar River discharges on average in the Rhine River 149 cubic meter of waters per second. Industrial activities, navigation, agriculture, to name but a few that are part of the drivers of the economy of the sub-basin that affect the Neckar watercourse profoundly.[1430]

The Main River is the third major tributary of the Rhine River. It measures 524 kilometres long and originates from the red Main, which flows from the Franconian Jura in Germany.[1431] The Main sub-basin measures approximately 27,251 square kilometres. It coincides with the northern part of the South Scrap land of Germany. Fifty-four percent of the sub-basin is made up of agricultural lands, whereas 38 percent are forests. 6.6 million people live in the Main River sub-basin, which represents a population density of about 242 individuals per square kilometre. The annual average of precipitations is around 665 mm, with a runoff of 255 mm.[1432] On average, the Main discharges some 43,4 cubic meters of water per second. Industrial discharges, diffuse agricultural inputs and sewage treatment plants are the main challenges to water quality in the Main River basin. However, a program for river monitoring which was launched in 1960 has significantly contributed to improving water quality in the Main River.[1433]

The Moselle River is the fourth major tributary of the Rhine River to be considered in this section. It is also an essential international waterway. The Moselle measures 544 kilometres long and drains from a catchment area of some 28,282 square kilometres that expands across France (54 percent), Germany (34 percent), Luxembourg (9 percent) and Belgium (3 percent).[1434] The Moselle River sub-basin is formed by agricultural lands (85 percent) mainly and forests (14 percent).[1435] 4.21 million people live in the sub-basin, thus representing an average density of 150 individuals/square kilometres; the average of precipitation across the sub-basin is around 841 mm, against a 365 mm

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[1430] *Ibid.*

[1431] *Ibid.* See details on the Franconian Jura on: 'Franconian Jura — Golden route through a Golden Land' available at *https://www.mygermancity.com/franconian-jura* , accessed on 21 July 2019.

[1432] *Ibid.*

[1433] *Ibid.*

[1434] *Ibid.*

[1435] *Ibid.*

runoff.[1436] The Moselle discharges, on average, some 328 cubic meters of waters per second. Wastewaters from the mining, the car industry, and the coal plants are the significant sources of pollution for the Moselle River.[1437]

8.4.4 Climate change and flood along the Rhine River

8.4.4.1 Historical floods and adaptation measures

Flood is an almost familiar phenomenon in the Rhine basin, to which climate change will only exacerbate. The ICPR estimates that the potential damages that are associated with floodings along the Rhine River basin are nearly 165 billion Euro.[1438] The abundance of waters and the topography of some parts of the Rhine basin may explain its exposure to floods.[1439] Since the Middle Ages, there were reports about frequent floods. Some of them were provoked by drifting ices from the Alpine region, which often caused severe damages in human and material terms.[1440]

To protect settlements from these recurring floods, people who lived in flood-prone areas ended up organising themselves, even if they did so with limited means of action and inadequate coordination capacities.[1441] That is the reason why, over the years, many human-made changes were made on the bed of the Rhine. In general, the structures that were erected to regulate the flows of the Rhine and to make them more stable, regular, and predictable worked with satisfaction, but people lacked the adequate capacity to maintain them. As a result, the flood protection structures became sources of several conflicts between the communities, in particular after the waters from a faulty flood control system from a community A upstream would cause significant damages in a community B downstream.[1442]

[1436] *Ibid*.

[1437] *Ibid*.

[1438] *Ibid*.; Information available at *https://www.iksr.org/de/* , accessed on 14 May 2019.

[1439] *Ibid*. at 37; Countries such as the Netherlands are situated at lower altitudes.

[1440] *Ibid*.

[1441] *Ibid*.

[1442] *Ibid*.

The period between 1993 and 1995 was marked in the Rhine River basin by constant floods that occurred mainly in the 1993 and 1995 winters.[1443] The flood of 1995 was particularly devastating because it caused the displacement of approximately 250,000 people from their homes in the Rhine delta area. The economic damages that were associated with the floods reached 1 billion US$.[1444] It was these 1993 and 1995 floods in particular that led to a significant change in the flood management discourse across the European Union.[1445] The union prepared some new policies that were generally aimed at transboundary cooperation in the field of flood management and protection across the European territory.

8.4.4.2 Predicted impacts

The Rhine basin is located in a temperate climatic zone, which is naturally marked by recurrent weather changes.[1446] The geographical location of the Rhine basin explains its overall climate which is characterised by rainfalls throughout the whole year and a mean annual temperature of 8.3 degrees Celsius.[1447] Currently, climate change is causing significant variations on the mean runoff and snowpack in the basin.[1448] In a recent study on climate change effects on the waters of Europe, Donnelly[1449] showed that changes in the basin's runoff were proportional to global warming. Under 3.0 degrees Celsius of temperature rise, for instance, impacts were worst and were widespread more than under 2.0 or 1.5 degrees Celsius. The ICPR commissioned a study that found out that by the middle of the current century, there will be up to 20 percent higher discharges in the Rhine basin during winters, against up to 10 percent of lower discharges during summers, with

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[1443] See H. Engel The flood events of 1993/1994 and 1995 in the Rhine River basin. *IAHS Publications-Series of Proceedings and Reports-Intern Assoc Hydrological Sciences* (1997) 239 21, 32; Uehlinger (note 1422 above; 37).

[1444] V. Stokkom *et al.* 'Flood defense in the Netherlands: a new era, a new approach' (2005) 1 (30) *Wat int'l* 76, 87.

[1445] See details in A. Smits *et al. New approaches to river management* (2000).

[1446] C. Donnelly *et al.* 'Impacts of climate change on European hydrology at 1.5, 2 and 3 degrees mean global warming above preindustrial level' (2017) 1-2 (143) *Cli Ch* 1, 13-26 & 24-25.

[1447] *Ibid.*

[1448] *Ibid.*

[1449] *Ibid.*

the probability of regional variations. The results of both studies suggest a higher likelihood of floods to occur.[1450]

8.4.5 Legal instruments addressing floods in the Rhine River basin

8.4.5.1 The Convention on the Protection and the Use of Transboundary Watercourses and International Lakes of 1992 and the United Nations Convention on the Non-navigational uses of International watercourses of May 21, 1997 UNWCC.

The legal instruments that address floods in the Rhine River basin are comprised of the Convention on the Protection of the Rhine of April 12, 1999,[1451] the European Water Framework Directive of October 23, 2000, and the European Floods Management Directive of October 23, 2007.[1452] Because of the objective of this thesis, the essentials of the analysis will focus on critical provisions for flood management that are in these instruments, including their implementation directives and tools, wherever it is applicable.

As for the 1992 UNECE WCC and the 1997 UNWCC, both instruments do not address flood issues in a specific manner. Even the 2007 EU Directive of October 23, 2007, on the Assessment and Management of flood risks, does not refer to both instruments as background Agreements. Apart from being multilateral framework conventions that are applicable to the field of transboundary water resources, both the 1992 UNECE WCC and the 1997 UNWCC have only limited applications on specific matters related to floods. The 1992 UNECE WCC, whose focus is on transboundary water pollution, has made an express

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[1450] ICPR *Scenarios for the Discharge Regime of the Rhine state* (2011), 21. Available at *https://www.iksr.org/fileadmin/user_upload/DKDM/Dokumente/Fachberichte/EN/rp_En_0188.pdf* , accessed on 14 May 2019.

[1451] Full text of the Convention on the Protection of the Rhine River of April 12, 1999 available at *https://www.iksr.org/fileadmin/user_upload/DKDM/Dokumente/Rechtliche_Basis/EN/legal_En_1999.pdf,* accessed on 14 July 2019.

[1452] Full text of the European Water Framework Directive of October 23, 2000 available at *https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF*, accessed on 14 July 2019; Article 14 of Directive 2000/60/EC *Establishing a Framework for Community Action in the Field of Water Policy;*. available at *https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:288:0027:0034:en:PDF* , accessed on 14 July 2019.

reference to floods, but only once and in general terms. Article 11 (1) of the 1992 UNECE WCC titled "Joint monitoring and assessment" provides:

> "In the framework of general cooperation mentioned in article 9 of this Convention or specific arrangements, the Riparian Parties shall establish and implement joint programs for monitoring the conditions of transboundary waters, including floods and ice drifts, as well as transboundary impact."[1453]

This provision places the responsibility on the states that are riparian parties to transboundary watercourses to jointly establish and implement programs that aim at monitoring the conditions of transboundary waters, including floodings and their impacts at transboundary levels.

As for the 1997 UNWCC, even though the agreement makes express reference to floods,[1454] its applicability in the Rhine basin is not yet basin-wide, because only five of the nine riparian states of the Rhine River basin are a party to the 1997 UNWCC.[1455] Article 27 of the 1997 UNWCC, which is also the only reference *expressis verbis* to floods, reinforces further the general character of both instruments in its Article 27, which stipulates:

> "Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as floods or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification."[1456]

Under the above provision, the 1997 UNWCC enjoins riparian states parties to adopt appropriate measures for flood prevention and mitigation, whether individually or jointly. In other words, from an international law perspective, the responsibility for flood measures

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[1453] Article 11 of the 1992 UNECE Watercourses Convention.

[1454] Article 27 of the 1997 UNWCC.

[1455] The riparian states of the Rhine River that are party to the 1997 UNWCC include: France, Germany, Italy, Luxembourg, and Netherlands. See more details in Annexe 1 below on the category of votes by states during the adoption of the 1997 UNWCC.

[1456] Article 27 of the 1997 UNWCC.

is laid on states' shoulders, whether individually or in groups, whenever circumstances dictate so.

8.4.5.2 The Convention on the Protection of the Rhine of April 12, 1999.

The Convention on the Protection of the Rhine was adopted on April 12, 1999, in Bonn, Germany.[1457] It entered into force on January 1, 2003. The Convention was signed for an indefinite duration between five of the nine riparian states of the Rhine River basin, namely France, Germany, Luxembourg, Netherlands, Switzerland and one representative of the European Commission.[1458] It took the Rhine riparian states almost 50 years to reach the current regime, which in the view of many observers has proven successful in many respects, besides addressing the issue of floods.[1459]

Articles 3 of the Convention on the Protection of the Rhine provides the objective of the convention. It shows a quasi-total focus on flooding issues. This is in substance what Article 3 provides:

> "The Contracting Parties shall pursue the following aims through this Convention:
>
> 1. sustainable development of the Rhine ecosystem, in particular through:
>
> (c) maintaining, improving and restoring the natural function of the waters; ensuring that flow management takes account of the natural flow of solid matter and promotes interactions between river, groundwater and alluvial areas; conserving, protecting and reactivating alluvial areas as natural floodplains;
>
> (d) conserving, improving and restoring the most natural habitats possible for wild fauna and flora in the water, on the river bed and banks and in adjacent areas, and improving living conditions for fish and restoring their free migration;

[1457] Hereinafter *the Rhine Convention*; Information available at:

[1458] Treaty Information available at *http://ec.europa.eu/world/agreements/prepareCreateTreatiesWorkspace/treatiesGeneralData.do?step=0&redirect=true&treatyId=634*, accessed on 10 July 2019.

[1459] A. Drieschova & I. Fischhendler 'Mechanisms to Reduce Uncertainty' (2011) *Int'l Wat Treat toolkit. Heb Univ of Jerus* 1, 29.

(e) ensuring environmentally sound and rational management of water resources;

(f) taking ecological requirements into account when implementing technical measures to develop the waterway, e.g. for flood protection, shipping or the use of hydroelectric power;

2. the production of drinking water from the waters of the Rhine;

3. improvement of sediment quality in order that dredged material may be deposited or spread without adversely affecting the environment;

4. general flood prevention and protection, taking account of ecological requirements."[1460]

The disastrous flooding of 1993 and 1995 and the activities and actions that followed, offered an opportunity to broaden the basin's cooperation around flood issues. The ICPR, which was in place since 1950 would be tasked with bringing concrete plans concerning the reduction of the vulnerability to flooding in the region.

After several developments, including various political declarations and position statements,[1461] the "Action Plan on Flood Defense for the Rhine" would be adopted in January 1998.[1462] The Action Plan was a phased program, aimed at improving both the protection of people and goods against floods while seeking to attain the ecological improvement of the Rhine River and its floodplains. The same Action Plan on Flood Defense for the Rhine would serve as the model for the drafting of the 2007 EU Floods Directive in provisions that dealt with similar issues.[1463]

[1460] Article 3 of the Convention on the Protection of the Rhine of 1999.

[1461] Besides the inputs from the European Union outlined above; the Ministers of the Environment of Belgium, France, Germany, Luxembourg, and the Netherlands declared in Arles, on February 4, 1995 that they thought necessary to reduce risks related to floods as rapidly as possible. To them, it was not acceptable that lives, properties, and the environment suffered at such great extent. This Minister's declaration is available at *https://www.iksr.org/fileadmin/user_upload/DKDM/Dokumente/Fachberichte/EN/rp_En_0092.pdf*, accessed on 24 July 2019.

[1462] See generally The Action Plan on Flood Defence for the Rhine available at *https://www.iksr.org/fileadmin/user_upload/DKDM/Dokumente/Broschueren/EN/bro_En_2007_Action_Plan_on_Floods.pdf* , accessed on 27 July 2019.

[1463] Information available at *https://www.iksr.org/en/eu-directives/floods-directive/,* accessed on 27 July 2019.

As mentioned earlier,[1464] the two multilateral treaties that provide for the management of transboundary watercourses have placed the responsibility of the adoption of whether basin-wide or country-wide flood management instruments on the shoulders of their state parties.

8.4.5.3 The European Water Framework Directive of October 23, 2000

The European Water Framework Directive establishes a framework for community action in the field of water policy.[1465] It was adopted on October 23, 2000, and entered into force on December 22, 2000.[1466] Its Article 1(e) stipulates that the purpose of the EU Water Framework Directive is to "establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which, among other things, to contributes to the mitigation of the effects of floods and droughts." Although the objective of mitigating the effects of floods was explicitly mentioned as one of the purposes to be achieved by the Water Framework Directive, only a few provisions addressed the floods and did so only in a general way.[1467]

These provisions include Articles 4.(3)(a)(iv), 4(6), and Article 11 (5). Article 4.6 for instance, recognizes the particularity of floods as an extreme phenomenon that may cause temporary deterioration of the status of the body of a watercourse, but do not recognise it to be a motive for a breach of a general requirement of the directive by a state.[1468] Article 11 also, on measures that states may put in place concerning river protection, creates a derogation to states to implement additional measures for river

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[1464] See sections 4.4 and 4.5 above.

[1465] EU Directive 2000/60/ec of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy (2000), 1–72, available at *europa.eu.int/eur-lex/pri/en/oj/dat/2000/l_327/l_32720001222en00010072.pdf,* accessed on 23 June 2019.

[1466] Information available at *europa.eu.int/eur-lex/pri/en/oj/dat/2000/l_327/l_32720001222en00010072.pdf,* accessed on 23 June 2019.

[1467] For an overview of the EU 2000 Water Directive, *see* R. Götz 'The European Community's Water Framework Directive: A Regional Approach to the Protection and Management of Transboundary Freshwater Resources?' in L. Boisson de Chazournes & M.A.S Salman (eds) *Water Resources and International Law* (2005), 429; *See also* H. Blöch *The European Community Water Framework Directive,* in L.U. Malgorzata *et al.* (eds.) *Management of Transboundary Water in Europe* (1998), 25.

[1468] Articles 4.(6) of the European Water Framework Directive of October 23, 2000.

protection more than the measures enshrined under Article 4 of the Directive if a flood was the cause of damage that breached states obligations under Article 4 on environmental measures.[1469] Both provisions are persuasive examples of mechanisms in treaty provisions that are adapted to the specificities of a particular river basin.

Besides the 2000 EU Water Framework Directive, several other initiatives from the European Union were launched, and that contributed to the adoption of The EU Flood Directives in 2007.[1470] As argued by Sanchez,[1471] the EU Flood Directive is a model of what states can achieve together to overcome a common threat in the field of water cooperation. The shared desire to overcome the challenges that flood represented to the communities living along the European Rivers pushed the member countries of the European Union to such a result.

8.4.5.4 The EU Flood Directives of October 23, 2007

Shortly after the adoption of the 2000 EU Water Framework Directive, the 2007 EU Directive for Floods followed.[1472] Perhaps in the spirit of the lawmaker of the 2000 EU Water Framework Directive, a specific instrument to address floods was already coming, and because of that, he would not create an overload of the 2000 EU Water Framework Directive with flood provisions. The EU Flood Directives was adopted on October 23,

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[1469] *Ibid*. Article 11 (5).

[1470] See for instance Directive 2000/60/EC and international principles of flood risk management. These principles were developed under the 1992 UNECE Convention on the protection and use of transboundary watercourses and international lakes, and approved by European Union Council Decision 95/308/EC. The Directive 2000/60/EC is available at *https://eur-lex.europa.eu/resource.html?uri=cellar:3b02206f-547c-43c4-84ad-c7572b0de0d6.0006.02/DOC_1&format=PDF* , accessed on 19 May 2019. See also the EU Council Decision 2001/792/EC, of 23 October 2001 that established a community mechanism to facilitate reinforced cooperation in assistance interventions regarding civil protection, available at *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001D0792&from=EN* , accessed on 19 May 2019.
Similar initiatives are available at *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002R2012&qid=1570130171163&from=EN*, accessed 19 May 2019.

[1471] Sanchez & Roberts (note 9 above; 74).

[1472] The European Parliament and the Council of Oct. 23, 2007, Directive 2007/60/EC, *On the Assessment and Management of Flood Risks*, 2007.

2007, and entered into force on November 26, 2007.[1473] The Directive is an instrument of 19 Articles, which is wholly focused on flood management and is applicable within the territory of the European Union.

As per Article 1 of the EU Flood Management Directive, the purpose of this Directive is:

> "to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community."[1474]

The EU Flood Management Directive focuses on three operational areas, including the preliminary flood risk assessment, in Articles 4 and 5, flood hazard maps and flood risk maps in Article 6, and flood risk management plans, in Articles 7 and 8. Besides, Chapter 5, including Articles 9 and 10, provide for flood-related information and consultation measures. Chapter 6 touches the implementation of measures and amendments, Chapters 7 and 8 respectively, deal with transitional measures and review mechanisms. The 2007 EU Flood Management Directive is one of the best examples from all over the world of transboundary cooperation whose focus was flood management.

While the EU Flood Management Directives appear to be entirely relevant for this thesis, it seems indicative to focus on some of its crucial features, which may be among the most useful not only for the rest of our discussions but also for any legal regime that will seek to adapt to climate change in a context where floods are predicted or are even already prevailing. As Rieu-Clarke [1475] noticed, even if the 2007 EU Flood Management as a binding legal instrument applies to national and transboundary contexts within the European Union space, most of the measures that this instrument provides for are applicable to any transboundary context all over the planet.

[1473] Full text of The EU Flood Directives of October 23, 2007 available at *https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:288:0027:0034:en:PDF* , accessed on 14 July 2019.

[1474] See Article 1 of The EU Flood Directives.

[1475] A. Rieu-Clarke 'A survey of international law relating to flood management: existing practices and future prospects' (2008) *Nat Res J* 649, 669.

8.4.5.4.1 Obligation to conduct preliminary flood risk assessment including the drawing of flood hazard maps and flood risk maps

Article 4 of the 2007 EU Flood Management Directive puts an obligation on the Rhine riparian states to:

> "undertake a preliminary flood risk assessment, in each river basin district, or unit of management referred to in Article 3(2)(b), or the portion of an international river basin district lying within their territory."[1476]

Such preliminary flood risk assessment must be "based on available or readily derivable information", such as records and studies on long term developments, in particular impacts of climate change on the occurrence of floods. Furthermore, a preliminary flood risk assessment shall be undertaken to provide an assessment of potential risks.[1477]

In a context where there is a likelihood of flood, whether because of climate change (as it is the case for the states of the Congo River basin), or any other reason (as it is the case of a naturally recurring phenomenon), riparian states are under obligation to conduct preliminary assessments of the situation regarding the risk to floods. Such preliminary assessments should include comprehensive information such as maps of the portion of the river basin or the sub-river basin under assessment. The preliminary assessments should provide as well a history of past floods in the area, which have had substantial impacts on the region, and further include available or updated projections regarding the likelihood of future floods to occur.[1478]

[1476] See Article 4.1. of the 2007 EU Flood Management Directives: "River basin district means the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) as the main unit for management of river basins." Which Article 3.1 provides "Member States shall identify the individual river basins lying within their national territory and, for the purposes of this Directive, shall assign them to individual river basin districts. Small river basins may be combined with larger river basins or joined with neighbouring small basins to form individual river basin districts where appropriate. Where groundwaters do not fully follow a particular river basin, they shall be identified and assigned to the nearest or most appropriate river basin district. Coastal waters shall be identified and assigned to the nearest or most appropriate river basin district or districts."

[1477] Article 4.2. of the 2007 Flood Management Directives.

[1478] Article 4.2 the 2007 EU Flood Management Directives provides: "(a) maps of the river basin district at the appropriate scale including the borders of the river basins, sub-basins and, where existing, coastal areas,

Articles 6 (1), 6 (2), 6 (3) of the Directive puts States under obligation to prepare either flood hazard maps or flood risk maps for areas where there exists a potential risk for floods to occur. The Directive maintains such an obligation even if the risk that is associated with the flood is only likely to occur (for floods with a low probability).[1479] The flood hazard maps that are required by the flood management directives are expected to contain a range of hydrological information that helps foresee and understand the potential of the flood, wherever appropriate.[1480]

The level of the details of the information to be included in the flood risk maps goes down to showing the potential adverse consequences that are associated with the flood scenarios as also required by the Directives.[1481] The potential adverse consequences, in particular, are to be expressed in terms of the indicative size of the population that will be affected (in terms of the number of inhabitants that are affected). At last, the riparian states are put under the obligation to make the flood risk maps available to the public.[1482]

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showing topography and land use; (b) a description of the floods which have occurred in the past and which had significant adverse impacts on human health, the environment, cultural heritage and economic activity and for which the likelihood of similar future events is still relevant, including their flood extent and conveyance routes and an assessment of the adverse impacts they have entailed; (c) a description of the significant floods which have occurred in the past, where significant adverse consequences of similar future events might be envisaged; and, depending on the specific needs of Member States, it shall include: (d) an assessment of the potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity, taking into account as far as possible issues such as the topography, the position of watercourses and their general hydrological and geomorphological characteristics, including floodplains as natural retention areas, the effectiveness of existing manmade flood defence infrastructures, the position of populated areas, areas of economic activity and long-term developments including impacts of climate change on the occurrence of floods." See Article 4.2 of the 2007 Flood Management Directives.

[1479] See Article 6.3.(a) of the 2007 Flood Management Directives.

[1480] *Ibid*. at Article 6.4.

[1481] *Ibid*.

[1482] *Ibid*. at Article 14.

8.4.5.4.2 Obligation to draft flood risk management plans

Under the EU flood Management Directive, planning for the management of the risks that are associated with floods is not an option but a mandatory obligation for river basin states. Article 7.1 of the Flood directive provides:

> "On the basis of the maps referred to in Article 6, Member States shall establish flood risk management plans coordinated at the level of the river basin district, or unit of management referred to in Article 3(2)(b), for the areas identified under Article 5(1) and the areas covered by Article 13(1)(b) in accordance with paragraphs 2 and 3 of this Article."

Active participation of the river basin districts that are of interest is a crucial thing not only for the production of the flood risk management plan but also for the review of its implementation and its amendment at a later stage. In a study on the need for active municipal involvement in planning ahead of flood events, Porta-Sancho[1483] stressed the central role that is played by the participation of the lower spheres of state governance, such as the municipalities, villages and other basic communities.

Societies that often demand from their governing bodies higher levels of safety against flooding have to become part of the identification of the problem and further collaborate on the implementation of the agreed solution. This participation, as argued by Porta-Sancho,[1484] is most crucial in flood-prone areas across the Rhine River basin, or the Congo River basin, as mentioned earlier.[1485] Besides, a government's best tools to ensure flood risk control remains the implementation of adequate regulatory and operational frameworks for flood risk management, which in substance requires the participation of the subjects of law and the entire societies, not only for the better appropriation of the process but also for ensuring a successful implementation of the Government's tools.[1486]

In order to improve flood governance, which in principle is supposed to be carried out, to the possible extent, in proximity with the governing structures of the flood-

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[1483] J.R. Porta-Sancho *et al.* 'The need for municipal action planning against flood risk: the risk-informed journey of the municipality of Oliva (Spain)' (2016) 2 (1) *VIT-Int'l J of Arch Tech & Sust* 1, 67, 67.

[1484] *Ibid.*

[1485] See section 5.2.5 above.

[1486] Porta-Sancho *et al.* (note 1489 above; 67).

prone areas, the EU Water Framework Directive of 2000 introduced the concept of *river basin districts*. Under this Directive, a river basin district is defined as "an area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) as the main unit for river basin management".[1487] The EU Regime enjoins riparian states to identify any of the river basins or sub-river basins that lay within their national territory. Riparian states are required after that, to assign these river basins or sub-river basins to individual river basin districts that have already been identified.[1488]

Small flood-prone river basins may be annexed to larger flood-prone area within a single river basin to form individual river basin districts wherever it seems appropriate to do so. From a transboundary perspective, what seems interesting is the fact that these river basins, sub-river basins or even individual river basin districts may include more than one riparian state at a time, which makes flood management to be more of a river basin issue than an individual riparian state. However, there are limitations at this juncture, as there is no obligation over states to jointly develop flood management plans. EU member states are free to develop their own flood management plans if they intend to do so. In such a situation, the only requirement upon EU member states is that they may co-ordinate those national plans with other EU member states within the same river basin district.

The EU 2007 flood Management Directives put riparian states under obligation to make available to the public any flood risk management plan.[1489] Plans are to be comprised of the conclusions that had sanctioned the preliminary assessment of flood risks in the area. They are also to include flood risk and hazard maps, and further specify the objectives of flood risk management, as well as a summary of the measures that have been prepared, with their intended aims while pursuing such appropriate flood risk management objectives.[1490]

As a complementary measure, Annex A (II) of the EU 2007 flood Management Directives requires the riparian states to include in flood risk management plans:

[1487] See Articles 2.15 and 3.1 of the EU Directive 2000/60/EC.

[1488] *Ibid*. Article 3.1.

[1489] Article 10.2 of the 2007 Flood Management Directives.

[1490] *Ibid*. Article 7.2.

> "1. a description of the prioritisation and the way in which progress in implementing the plan will be monitored;
> 2. a summary of the public information and consultation measures/actions taken;
> 3. a list of competent authorities and, as appropriate, a description of the coordination process within any international river basin district."[1491]

The essential character of developing flood risk preventive or corrective actions at a local scale cannot be overemphasised. As argued by Merz,[1492] planning for floods at a local scale will remain one of the essential components of any flood management scheme. A robust example of active municipal involvement under the EU directives can be drawn from the Spanish regulatory framework for flood risk management.[1493]

This instrument describes the procedures that are applicable in terms of emergency management. These procedures involve all the civil authorities whose mandates are concerned with issues regarding protection and urban planning.[1494] Also, the Spanish instrument requires all municipalities whose flood risks are medium or high, to develop local action plans for flood risk management, which plans have to comply with the requirements of the 2007 EU flood Management Directives.[1495]

At last, Article 8.3 of EU flood Management Directives encourages riparian states to adopt to the extent possible a single transboundary plan for flood risk management.[1496] If the basin's context does not allow the production of a single flood risk management plan, riparian states are required to adopt more localised flood risk management plans, which will only cover a state's section of the international river basin district. [1497] The Directive further enjoins riparian states to ensure that the measures they

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[1491] *Ibid*. Annexe A.

[1492] B. Merz *et al.* Flood risk mapping at the local scale: concepts and challenges' in *Flood risk management in Europe* (2007) 231, 231.

[1493] A. Serra-Llobet *et al.* 'Governing for integrated water and flood risk management: Comparing top-down and bottom-up approaches in Spain and California' (2016) 10 (8) *Water* 445.

[1494] Porta-Sancho (note 1489 above; 67).

[1495] Article 5 of the 2007 EU flood Management Directive.

[1496] *Ibid*. Article 8 (3).

[1497] *Ibid*.

adopt in accordance with Articles 4 and 5 of the Directive, and their related provisions, regarding flood management, do not cause significant harm to neighbouring states.[1498]

8.4.5.4.3 Obligation to exchange information and to consult other member states concerning significant flood-prone projects

The EU flood Management Directive has put the EU member states under obligation to exchange information and consultation with the other member states on significant flood-prone projects. Article 9 of the 2007 EU flood Management Directive provides:

> "Member States shall take appropriate steps to coordinate the application of this Directive and that of Directive 2000/60/EC focusing on opportunities for improving efficiency, information exchange and for achieving common synergies and benefits having regard to the environmental objectives laid down in Article 4 of Directive 2000/60/EC."[1499]

The information exchange referred to in this provision targets particularly "the development of the first flood hazard maps and flood risk maps and their subsequent reviews", based on Articles 6 and 14 of the flood management Directive.

Also, in implementing the Directive, and more specifically in assessing flood risks potentials in areas that are located within transboundary river basin districts, riparian countries are put under obligation to exchange any significant information not only between the governments of the interested countries but also with different national and supranational authorities, including river basin organisations. The authorities that are considered in the information-sharing obligation above are the authorities whose mandates include flood risk concerns.[1500]

As discussed earlier,[1501] the observation of the principle of information sharing requires generally that the river basin states may establish some cooperation

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[1498] *Ibid.* Article 7 (4) "States shall ensure that flood management measures taken by one riparian do not cause "increase [in] flood risks upstream or downstream [in] other countries in the same river basin or sub-basin" unless such measures have been coordinated and agreed upon amongst the member states."

[1499] *Ibid.* Article 9.

[1500] *Ibid.* Article 4 (3).

[1501] See section 4.3.6 above.

mechanisms first. The necessity to first lay the foundations for water cooperation over a shared water resource is reflected in the preambles of the 2007 EU flood Directive. Paragraph five of the preamble proclaims: "Effective flood prevention and mitigation requires, in addition to coordination between the member states, cooperation with third countries."[1502]

Under the 2007 EU Flood Management Directives, cooperation for flood prevention and management extends to other countries that are not member states of the EU, as long as there exists the necessity to cooperate with such countries, with the view of reaching optimal levels of flood management. In the context of transboundary river basin districts which were mentioned earlier,[1503] the obligation of prior information exchange extends to both the preparation of flood hazard maps and the preparation of flood risk maps.[1504] This obligation adds to the one that urged riparian states to cooperate in designating the flood management units in transboundary river basin districts. Such flood management unit is the one of which the climatic previsions have already established the existence of a significant flood risks potential.[1505]

The involvement of the public constitutes a further dimension for states' obligation to the regime under study. Article 10 (1) of the 2007 EU flood Directive enjoins member states "to make available to the public the preliminary flood risk assessment, the flood hazard maps, the flood risk maps, and the flood risk management plans", [1506] in compliance with the applicable legislation across the EU. Besides, member states are required to encourage active involvement and participation of any party that can be interested in the production, the amendment, or the review of the flood risk management plan.[1507] In the sense of this obligation, states are not only required to share flood-related information, but also to encourage, incentivise to the possible extent, and ensure active participation of the public.

[1502] Paragraph 6 of the Preambles of the 2007 Flood Management Directives

[1503] See section 8.3.5.4.2 above. See the provisions that create the river basin districts in note 1419 above.

[1504] Article 6 (2) of the 2007 Flood Management Directives.

[1505] *Ibid*. Article 5 (1).

[1506] *Ibid*. Article 10.

[1507] *Ibid*. Article 10.2.

8.4.5.4.4 Review mechanisms

The Review mechanism provided for in the 2007 EU flood Directive concerns the preliminary flood risk assessment, the flood hazard maps, the flood risk maps, and the flood risk management plan. Article 14 of the Directive provides as follows:

> "1. the preliminary flood risk assessment, or the assessment and decisions… shall be reviewed, and if necessary updated, by 22 December 2018 and every six years thereafter.
> 2. The flood hazard maps and the flood risk maps shall be reviewed, and if necessary updated, by 22 December 2019 and every six years thereafter.
> 3. The flood risk management plan(s) shall be reviewed, and if necessary updated… by 22 December 2021 and every six years thereafter.
> 4. The likely impact of climate change on the occurrence of floods shall be taken into account in the reviews referred to in paragraphs 1 and 3."[1508]

The EU flood Directive has instituted a regime of obligations review, or if necessary, the update of both the preliminary flood risk assessment, the flood hazard maps, the flood risk maps, and the flood risk management plan.[1509] As shown in Article 14 above, after the initial mandatory date of review or update provided by the Directive, a timeframe of six years is given, at the end of which there must be a process of review, or if necessary, the update for all the obligations referred to by Article 14.

8.4.6 Concluding thoughts concerning the flood management regime of the Rhine River

Three fundamental flood-related obligations lie (among other things) on the Rhine River basin's states, which are under the regime that is moulded by the 2000 EU Water Directives and the 2007 EU Flood Management Directives. The obligations here include the undertaking of a preliminary flood risk assessment (which comprises the drawing of flood hazard and flood risk maps), the obligation to draft and execute flood risk management plans, and the obligation to exchange information and to consult with the other states of the basin regarding the projects that are likely to have possible transboundary impacts. The

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[1508] *Ibid*. Article 14.

[1509] *Ibid*.

flood regime applicable to the Rhine transboundary watercourse has thus offered a meaningful case study that has the potential to inspire other regimes elsewhere.

Flooding is a natural phenomenon that, however, can be exacerbated either by direct or indirect human interventions.[1510] The Rhine River has long suffered from the phenomenon but has shown significant resilience to it since the adoption and the implementation of the robust flood management regime of the European Union. As for paraphrasing Rieu-Clarke,[1511] there is no doubt that the flood management regime that was instituted by the European Union has offered some of the most relevant tools and instruments for flood management in a transboundary context, from which, it seems evident that the regime that applies to the Congo River and its tributaries can have much to learn.

8.5 Case study 2: Transferring floodwaters from the Danube to the Rhine River basin

8.5.1 The interest of the Danube-Main-Rhine case study

The Danube-Main-Rhine water transfer case study is the second of the present thesis. The case gives an illustration regarding the link that may exist between flood management and water transfer. The aim here is to identify some practical aspects of this project that may inspire flood management in the Congo River basin, faced with both flooding episodes and the solicitation of water transfers to save Lake Chad. The collection of the surplus of waters from excessive rainfalls from one flood-prone river basin as a means of flood control can provide additional water resources to be transferred towards a demanding river basin as a means of droughts control in the basin of destination.[1512]

Such an approach, which has not yet been formally envisaged in the CICOS regime, may become one of the crucial ways of raising the required funds to design and implement adequate flood management regimes across the basin. However, the limitation of the Danube-Main-Rhine water transfer case comes from the fact that its water transfer

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[1510] I.D. Frijters & J. Leentvaar *Rhine case study* (2003), 29.

[1511] Rieu-Clarke (note 1481 above; 669).

[1512] There is not only rainfall waters. Seasonal Snow melt also form part of the amount of water to be collected from the Danube river basin and diversted to the Rhine River basin. For more details, see section 8.3 above.

happened within the boundaries of a single country, which is Germany, and that could not yield further information regarding the transboundary character of such transaction.[1513]

Two reasons led to the drafting of the Danube-Main-Rhine project: the necessity to drain the excessive amounts of waters in the south of the state of Bavaria during the flooding season, and divert such excessive waters northwards the same state to correct periodic water imbalances that prevailed in that region.[1514] The transfer of waters that are solicited from the Congo River may serve the same purpose, meaning to organise the collection of the excessive waters from some flood-prone areas, and transfer of such waters to the outside of the basin to satisfy the request for water transfer.[1515]

In this case, it may happen that all of the flood management steps that need to be undertaken as described above may benefit from possible water transfer fundings, and while improving flood management across the basin. Synergy is needed, therefore, between the claims for water transfer and the need to develop flood control measures across the Congo River basin as it was the case in the Danube-Main-Rhine.

The Danube-Main-Rhine water transfer scheme was not done for lucrative purposes. The transfer was conducted by the German government and took place within the German territory. There was no transboundary dimension except for the observation of applicable provisions that are related to the transboundary harms that may be caused by such a project. However, the case illustrates well enough the possibility of generating additional resources through the establishment of adequate flood control measures. The flood control measures, in this case, will be aimed at harvesting the excessive seasonal waters across the Congo River basin, with the intention of a lucrative interbasin water transfer. In that sense, the case illustrates how it can be possible for a state or a group of states to generate additional resources from flood management operations.

The Danube-Main-Rhine water transfer involved several riparian states from both sides, meaning in the basin of origin and the basin of destination. Despite such a significant number of interested parties, the transfer project was not opposed, thus proving a successful

[1513] See Section 8.3 above.

[1514] See Section 8.3.3 above.

[1515] See Section 5.6.2 above.

work of negotiations and communication before the execution of the transfer.[1516] The constructive legal response of the states in both basins had the advantage of finding across the basin working water cooperation, which as emphasised earlier,[1517] is the critical component for successful transboundary or domestic enterprise that would target an international watercourse.

This Danube-Main-Rhine water transfer illustrates a successful combination of flood management and water transfer. Water is collected from a flood-prone area in the Danube River basin to a "drought-prone area" in the Rhine River basin, through the Main River. The case exemplifies how floodwaters can be harvested and stored from flood-prone areas and transferred to drought-prone areas. The aim here is to identify some practical aspects of this project that may inspire flood management in the Congo River basin, which is faced with solicitation of water transfers to save Lake Chad.

8.5.2 The Danube River and its hydrographic basin

The Danube River is a transboundary watercourse that crosses the central and eastern regions of the European continent.[1518] Its hydrographic basin covers approximately 817,000 square kilometres, whereby live some 83 million people, of which 20 million rely on its waters for drinking purposes.[1519] Nineteen countries in total contribute to the waters of the Danube River.[1520] Such an enormous number of riparian states for a single river is unique in the world.[1521] The River originates from the German Black Forest from where it flows

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[1516] G. Korompal 'The effects of the Europa canal Rhine-Main-Danbue on Hungarian inland navigation' (1977) *Geo J* 33, 33.

[1517] See Section 4.3.4 above.

[1518] The study area of case study two involves both the Danube and the Rhine River. The Rhine River case was alredy presented in the precedent section. The current section will be limited to the Danube River.

[1519] ICPDR *On the Implementation of the Joint Program of Measures in the Danube River Basin* (2018), 2. Interim Report, available at *https://www.icpdr.org/flowpaper/app/#page=1'* , accessed on 12 July 2019.

[1520] *Ibid*.

[1521] *Ibid*.; For official purposes, only fourteen of these nineteen are included in the Danube River basin, because of the requirement that only those states that have at least 2,000 km² of their national territory located within the Danube River basin are granted full contracting powers in the International Commission for the Protection of the Danube River (ICPDR). For further details on the ICPDR, see: *https://www.icpdr.org/main/icpdr/about-us*, accessed on 12 July 2019.

southeast, crossing or bordering ten countries before its discharge into the Black Sea eastward.[1522]

In history, the Danube River has played a crucial role in the region as the main waterway of transportation for commercial and military purposes for about 2,000 years.[1523] Such a role was played naturally possibly because the Danube River is the only waterway that crosses Europe from the west to the east.[1524] These countries include Austria, Bulgaria, Croatia, Hungary, Moldova, Serbia, Slovakia, Romania, and Ukraine before discharging into the Black Sea. The control of the Danube River has played a crucial role in the history of the European continent because of the very same physical characteristics. Even at present, the Danube River is considered as the hub of the region's development.

From a political viewpoint, the river also plays a critical role because it passes through many large cities, including four capital cities of Europe, namely Belgrade, Bratislava, Budapest, and Vienna.[1525] Several activities are developed on the banks of the Danube, and which contribute favourably to the development of the region. These activities include navigation, hydropower generation, agriculture, recreation, and the conservation of the natural environment.[1526]

From a water pollution perspective, up to the 1980s, the quality of the waters of the Danube was a critical issue, because of the extent of the pollution that occurred in the region, which mainly originated from the basin's dense population, its intense agriculture, and developed industry. It is generally believed that the coherent implementation of the European program of transboundary water cooperation has led to a significant drop in the level of water pollution across the basin. In 2018, the ICPDR expressed its encouragement because the Danube River was granted an EU mark for recognition as being ecologically suitable for about 24.7 percent.[1527]

[1522] D.C. Mckinney 'Transboundary water challenges: case studies' (2011) *Cent for Res in Wat Res* 1, 51.

[1523] *Ibid.*

[1524] *Ibid.*

[1525] *Ibid.*

[1526] *Ibid.*

[1527] *Ibid.*

8.5.2.1 Hydrological descriptions and climate change

Being a waterway of approximately 2,850 kilometres, the Danube River is the second-longest river in Europe.[1528] The average discharge of the Danube River into the Black Sea is estimated to be 6,500 cubic meters per second.[1529] The Danube River basin can generally be considered a dry region because it receives only around 450 mm of rains per year. In 2012, the ICPDR became the first river basin institution in the world to produce a climate adaptation strategy.[1530] This ICPDR's study discovered the increased risk for severe droughts in some parts of the Danube River basin to occur.[1531] It further found a strong likelihood that low flow and water scarcity may increase in intensity and become more prolonged and more frequent across the basin because of climate change.[1532] In 2015 for instance, most parts of the Danube River basin suffered drought due to prolonged high temperatures, which were well above 40 degrees Celsius.[1533]

8.5.2.2 The Danube-Main-Rhine project

The German state of Bavaria is the country's largest state. It has a surface area of approximately 70,548 square kilometres.[1534] Both the Rhine and the Danube Rivers basin overlap the State of Bavaria. The state is located in the southern part of Germany and comprises approximately a fifth of the total surface area of the country.[1535] The state has 13 million inhabitants, and is the second-most populous state of Germany, after the North

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[1528] *Ibid.*

[1529] *Ibid.*

[1530] Information available at *https://www.icpdr.org/main/activities-projects/climate-change-adaptation* , accessed on 21 July 2019.

[1531] *Ibid.*

[1532] *Ibid.*

[1533] Based on such initial assessment of climate change vulnerability at the Danube River basin scale, the ICPDR is assisting riparian country parties with water management information at hydrographical basin level, so that these countries may decide on suitable measures for cooperation on adaptation measures, based on the impacts that are most likely to occur. See for more information note 1473 above.

[1534] Information available at *https://www.bavaria.by/country-people/geography-facts/* , accessed on 19 June 2019.

[1535] *Ibid.*

Rhine-Westphalia state. Water resources are distributed unevenly across the state of Bavaria, with the South of the State being more furnished in water than the north. [1536]

There are high rainfalls and snow heaps in the mountainous regions south of the Bavaria state, which is within the Danube River basin.[1537] The rainfalls and the melting of snow heaps contribute to the production of considerable runoff rates in the southern region of the state of Bavaria. Besides, the region is rich in groundwaters storages from the Alpine mountainous region. The southern region is also prone to seasonal floods.[1538]

The situation northwards is almost the opposite of the south. Northern precipitations are lower, and groundwater storage is somewhat limited. The north is part of the Rhine River basin, and the Main sub-river basin, and is densely populated due to its advanced industrial development. The combination of these two factors has resulted in an imbalance between water availability and water demand, and permanent stress on the existing resources. To correct this situation, the state of Bavaria and the German federal government decided to proceed to a water transfer from the southern part of the Bavaria state to its northern part, in order to solve the situation of permanent water imbalance that prevailed northwards. The project was approved in 1970; its first phase became operational in 1992, whereas the second was completed in the year 2000.[1539]

In order to divert the waters of the Danube into the Rhine River, the Bavaria state set in place a complex system formed by two sub-systems. The first is comprised of an existing Main-Danube canal of navigation, which naturally connects the Main River to the Danube River basin, some pumping stations, and diversion channels, some hydroelectricity power plants and open water channels, and several reservoirs for water storage. The amount of waters diverted is around 125 million cubic meters per year.[1540] The second sub-system specialises in the retention, storage, and transfer of waters northwards

[1536] *Ibid.*

[1537] *Ibid.*

[1538] *Ibid.*

[1539] ICPDR *The Danube River Basin District* (2005), 34-35.

[1540] *Ibid.*

from the flooding waters of the water-rich southern region of the Bavarian state. This sub-system diverts around 25 millions of waters annually.[1541]

The execution of the project began long enough before the adoption of the current regime, which applies to the transboundary waters of the region. Nevertheless, the project had to adapt its overall institutional and operational structure to comply with the regime.[1542] The project conformed itself to the EU 2000 Water Directives and the 1992 UNECE WCC for issues that relate to international responsibilities in transboundary matters. Key provisions of the EU 2000 Water Directives that were applied included its objective, which was discussed above, "to establish a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater".[1543]

The project aligned itself also to Article 5 the EU 2000 Water Framework Directives, which enjoins the European Union member states to ensure that for each portion of an international river basin which is located within their national territory, they analyze the characteristics of it, in portion or entirely, and that they "review the impacts of human activities on the status of the surface waters and groundwater."[1544] The member states of the union are further put under obligation to undertake and update an economic analysis of the uses that are made with the portion of the international watercourse within their territory, with the view of guaranteeing the protection of such watercourse. The Danube-Main-Rhine water transfer project from the flood-prone part of the Bavaria State, in the Danube River basin southward to the drought-prone zone of the same State northwards, is thus justified under Article 5 above.

8.5.3 Thinking on interbasin water transfers due to the impact of climate change

"Interbasin water transfers" are water transfers that occur between at least two distinct basins.[1545] An interbasin transfer is defined as ''the transfer of water resources from one geographically distinct river catchment, or basin to another''. To borrow the terms of

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[1541] *Ibid.*

[1542] *Ibid.*

[1543] Article 1 of the EU 2000 Water Directive; See also section 8.3.5.3 above.

[1544] *Ibid.* Article 5.

[1545] see B.R. Davies *et al.* 'An assessment of the ecological impacts of inter-basin water transfers, and their threats to river basin integrity and conservation' (1992) 4 (2) *Aq cons: Mar & freshw ecos* 325, 325.

Mahabaleshwara,[1546] while the transfer of water resources from one river basin to the other may be an option in some regions of the globe, it has already become the "need of the hour" in some others. Countries such as India or China, or regions such as the Middle East, and the Southern part of Africa have a broad experience in interbasin water transfers.[1547]

Until recently, interbasin transfers diverted annually some 5,400 billion cubic meters of waters, which represent about 14 percent of water withdrawals at the global level.[1548] Gupta[1549] indicates that all the proposed interbasin transfers, which will occur by the year 2025 will bring the above-cited global amount of annual interbasin water transfers to approximately 9,400 billion cubic meters. The transfer of water resources from one hydrographic basin to the other generally raises multiple cross-sectoral issues, whether environmental, technical or agrarian regarding property rights.

Based on the works of various other contributors,[1550] Gupta[1551] proposed a consolidated set of criteria for the assessment of the relevancy of large interbasin water transfers in the contexts of the IWRM approach. Gupta's fivefold criteria sought to confirm that the interbasin water transfers project was based on both actual water surplus and deficit, sustainability, good governance, the balance of existing rights with needs, and on sound science.[1552]

The real surplus criterion seeks to verify whether there is "an objectively verifiable surplus in the donor basin, and an objectively verifiable deficit in the recipient

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[1546] H. Mahabaleshwara & H.M. Nagabhushan 'Inter basin water transfers in India–a solution to hydrological extremities' (2014) 3 *Int J Res Eng Technol* 530, 531.

[1547] Strategic foresight group 'benefit of Coopration in the Middle East' (20018), available *https://www.strategicforesight.com/publication_pdf/Benefits%20Of%20Cooperation%20-%20Full%20Report.pdf* , accessed on 12 July 2019.

[1548] J. Gupta & P. Van Der Zaag 'Interbasin water transfers and integrated water resources management: Where engineering, science and politics interlock' (2008) 1-2 (33) *Phys and Chem of the Ear Parts A/B/C* 28, 29.

[1549] *Ibid*.

[1550] See for instance K. Rahman 'Interbasin water transfer: Bangladesh perspective' In in UNESCO (ed) *Interbasin Water Transfer. Proceedings of the International Workshop* (1999), 81–95; S. Postel 'The Last Oasis: Facing Water Scarcity (2000).

[1551] Gupta & Van Der Zaag (note 1511 above; 34).

[1552] *Ibid*.

basin, and checks if there was an efficient use of water (with the best available technology)."[1553] The sustainability criterion is an effort to confirm whether "the transfer scheme is sustainable in environmental, social, and economic terms, and whether it is adaptive to natural and social stresses." [1554] The good governance criterion strives to ensure that the transfer of water includes participatory decision-making and accountability to the public, including the affected people.[1555]

The water right and need criterion try to confirm whether "the water transfer scheme respects existing rights and responsibilities (at local, national, and international levels); is without negative extra-territorial effects and impact on other riparian countries". The water right criterion also ensures that if such impact occurs nevertheless, adequate compensation measures or have been agreed upon."[1556] Gupta's[1557] last criterion assesses if the transfer scheme is based on sound science. Sound science in the view of Gupta "implies project compliance with hydrological, ecological, and socio-economic relevant tests and analyses".

In a nutshell, the above discussion suggests the possibility of transferring waters from one basin to the other, provided certain conditions are met. Adequate flood management programmes around the Congo River and its tributaries, both the domestics and the transboundary may contribute to the development of water transfer programmes that meet Gupta's criteria.

8.6 Conclusion

This chapter aimed to study flood management regimes that are in place in the Rhine and Danube River basins. The reason behind the two study cases revolved around the fact that a mere inclusion to climate change in a transboundary water regime, or its mention in a water treaty may not be enough for adequate regime responsiveness to the predicted impact of climate change. To be adequately responsive, such a regime will need to undertake further steps through adopting specific instruments that will aim at addressing thoroughly

[1553] *Ibid*. at 32.

[1554] *Ibid*.

[1555] *Ibid*.

[1556] *Ibid*.

[1557] *Ibid*.

the predicted impact of climate change, which in the case of shared water resources can be either floods or droughts. In the case of the CICOS regime, the specific instruments required to address the predicted impact of climate change would need to focus on flood management. Whereas the flood management regime in place in the Rhine River have discussed the relevant instruments and procedures for adequate flood management, the Danube-Main-Rhine interbasin water transfer has illustrated that adequate flood management can offer both flood protection, disaster prevention and additional water resources to feed an interbasin water transfer scheme. The key findings of this chapter are as follows: A flood management regime should include adequate mechanisms for flood prevention and management, whose first step is the obligation for state members to conduct preliminary flood risk assessments, whether individually or jointly, depending on the hydrography of the river basin or the sub-river basins that of concern. The preliminary flood risk assessments should include the drawing of flood hazard maps and flood risk maps. The regime should be comprised of an obligation that is laid upon the riparian states to draft flood risk management plans and exchange flood-related information. Riparian states should also be obliged to consult each other for any development that might result in floodings. In terms of water transfers, findings are that interbasin cooperation is useful, and should favour the creation of synergies between flood control and water transfers. Based on the findings of this chapter, the next chapter will assess the extent to which the climate change dimension has been integrated into the regime that governs the waters of the Congo River and its transboundary tributaries, which regime, this thesis refers to as the CICOS regime. The next chapter will first apply *Cooley & Gleick's criteria framework*, to assess the integration of the climate change dimension in the CICOS regime, and after that undertake a comparative analysis between the flood management regime that applies to the Congo River and its transboundary tributaries and the flood management regime that is applied across the Rhine River basin.

9 ASSESSING THE RESPONSIVENESS OF THE REGIME THAT GOVERNS THE CONGO WATERCOURSE TO THE PREDICTED IMPACTS OF CLIMATE CHANGE

9.1 Introduction

Previous chapters have discussed the generalities that are associated with the international law of the transboundary watercourses. They also made a hydrographic presentation of the Congo River and its transboundary tributaries and discussed the legal regime thereof. Previous discussions analysed the flood management regime that applies to the Rhine and the Danube River basins, with the view of providing a reference for regimes comparison with the regime that applies to the Congo River basin. This chapter sets out to assess the extent to which the legal framework that governs the Congo River and its transboundary tributaries has integrated the climate change dimension. The regime assessment will be done on the basis of *Cooley & Gleick's criteria framework* which was discussed in chapter 7 above and through a comparative analysis of the regime that governs the Congo River and its transboundary tributaries to the flood management regime of the Rhine River basin. More emphasis will be put on the flood regime because floodings will represent the primary impact of climate change on the water resources of the Congo River basin as evidenced in the previous chapters. This chapter will be comprised of two sections. The first section will assess the responsiveness of the CICOS regime to the climate change phenomenon, whereas the second section will undertake a comparative assessment of the flood management provisions under the CICOS regime and the flood management regime over the Rhine River basin.

9.2 The responsiveness of the CICOS regime to climate change

9.2.1 Background information

As discussed earlier,[1558] the legal regime that governs the Congo River and its transboundary tributaries comprises two treaties, namely the agreement establishing a uniform regime of navigation on the Congo River and its Ubangi and Sangha tributaries of 1999, and the CICOS Additive Treaty of 2007.[1559] The aim of the original agreement of 1999 was, as suggests its title, to establish a uniform regime of navigation on the Congo River and some of its tributaries, including the Ubangi and Sangha Rivers, and to create the basin commission, referred to as "the CICOS". The aim of the 2007 CICOS Additive Treaty was to "promote the integrated management of water resources on the territory under the jurisdiction of the CICOS".[1560] It also expanded the scope of the CICOS regime to all the parts of the Congo River basin that are situated on the member states' territory.[1561]

The original agreement of 1999 was focused exclusively on navigational issues. The 2007 CICOS Additive Treaty constituted, therefore, an extension of the CICOS' original mandate, which allowed the commission to cover some non-navigational issues concerning the Congo River and its tributaries as well. The Addendum of a treaty constitutes, by principle, an integral part of the original text, to which it either adds some new aspects or alters some of the existing ones. That is why the two CICOS Agreements are to be approached as one and referred to as the *CICOS regime*.[1562]

Although it may be important to undertake some analysis concerning the impact of climate change on the shared waters of the Congo River basin from a navigational perspective, navigation does not constitute the primary focus of this thesis. Therefore, the assessment that will be conducted in this section will focus on the CICOS 2007 Additive Treaty because it is the part of the CICOS regime that allows the assessment of its effectiveness in integrating the climate change dimension. The assessment, as already

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[1558] See section 6.3 above.

[1559] See section 6.3.2 above.

[1560] Article 2 of the 2007 CICOS Additive Treaty.

[1561] See Article 1 (15) of the 2007 CICOS Additive Treaty.

[1562] See section 6.3.2 above.

mentioned, will be based on *Cooley & Gleick's criteria framework*, which checks the following:

- The existence of flexible water allocation strategies and water quality standards
- The existence of strategies of response to extreme weather events
- The existence of treaty amendment and review process
- The existence of joint institutions

9.2.2 Climate change and the objective of the CICOS regime

The objective of the 2007 CICOS Additive Treaty can be subdivided into five sub-objectives, of which only one has taken into account the impacts of climate change on the waters of the Congo River basin in a more express way. Article 2 of the 2007 CICOS Additive Treaty stipulates that the objective of the Treaty is to "promote the integrated management of water resources on the territory which is under the jurisdiction of the CICOS".[1563] When read together with the objective of the Additive, paragraph 2 of Chapter 2 of the 2007 CICOS Additive Treaty becomes: [1564]

> "The objective of the current additive is to promote the integrated management of water resources on the territory under the jurisdiction of the Commission by way of defining the modalities of examination and approbation of new projects that are likely to affect the quality and quantity of water resources".[1565]

[1563] Article 2 of the 2007 CICOS Additive Treaty.

[1564] Such territory includes the areas that form the hydrographical basin of the Congo River and situated on the territories of all the CICOS member states. The territory of competence of the 2007 CICOS treaty additive is defined under its Article 1 (15). Paragraph 2 of Article 2 of the 2007 CICOS Additive (the original french version) stipulates: « Le présent Additif a pour objet de promouvoir la gestion intégrée des ressources en eau sur le territoire de compétence de la Commission: en définissant les modalités d'examen et d'approbation de nouveaux projets susceptibles d'affecter la quantité et la qualité de J'eau.» See also Article 1 (15) of the 2007 CICOS Additive which defins its territory of competence.

[1565] Paragraph 2 of Article 2 of the 2007 CICOS Additive (the original french version) stipulates « Le présent Additif a pour objet de promouvoir la gestion intégrée des ressources en eau sur le territoire de compétence de la Commission: en définissant les modalités d'examen et d'approbation de nouveaux projets susceptibles d'affecter la quantité et la qualité de l'eau.»

Sonoda[1566] and many other scholars have established clear links between the IWRM approach and the adaptation to climate change in the water sector, including in transboundary contexts. Sonoda defines the IWRM approach as:

> "a step-by-step process of managing water resources in a harmonious and environmentally sustainable way by gradually uniting stakeholders and involving them in planning and decision-making processes while accounting for evolving social demands due to such changes as population growth, rising demand for environmental conservation, changes in perspectives of the cultural and economic value of water, and climate change." [1567]

Upadhyaya,[1568] on his side, claimed that the predicted impacts of climate change should be taken into consideration while managing water resources based on the IWRM approach.

Both Sonoda's definition and Upadhyaya's observation recall the intertwined character of both acts, namely the integration of the climate change dimension on one side, and the adoption of the IWRM approach on the other side, in the same legal regime that will govern water resources.[1569] The adoption of an addendum to the 1999 CICOS initial treaty with the specific objective of including the IWRM dimension in the original regime that was dedicated to navigation, shows the degree of openness of the negotiators of the 2007 CICOS Additive Treaty regarding the inclusion of the climate change dimension in the regime.

In as much as the impacts of climate change on the waters of the Congo River are in the majority quantitative, the objective of the 2007 CICOS Additive Treaty that is mentioned above makes the CICOS regime theoretically responsive to climate change. As abundantly mentioned above,[1570] the Congo River basin is more prone to floods than to any other impact from climate change. However, given the fact that climate change

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[1566] T. Sonoda *Introduction to the IWRM Guidelines at River Basin Level* (2009), 3, available at *file:///C:/Users/213570379/Downloads/185074e%20(1).pdf* , accessed on 12 May 2019; See generally UNDP *Climate Change Adaptation and Integrated Water Resources Management* (2019).

[1567] *Ibid*. Sonoda.

[1568] Upadhyaya (note 1220 above; 2).

[1569] *Ibid*.; Sonoda (note 1572 above; 3).

[1570] See section 5.6.1 above.

was not the primary focus of the 2007 CICOS Additive Treaty, the question turns to become "how far has such openness to the climate change phenomenon gone"?

9.2.3 Climate change and the legal principles that govern the CICOS regime

Apart from being inserted in the objective of the 2007 CICOS Additive Treaty, the integration of the climate change was further reflected in the principles of the Additive Treaty, as testifies its Article 4, which defines the principles of the CICOS regime, which the parties have to observe in order to maintain their commitments under the 2007 CICOS Additive Treaty. Although some of these principles are rather general, others are more specific and seem to bring to the parties the necessary stand which they need to fast adapt to any changing condition on the transboundary water resources of the Congo Basin.

These CICOS principles show strong similarities to the principles of the law of the non-navigational uses of the international watercourses, as proclaimed under the 1997 UNWCC. The principles of Article 4 of the CICOS Additive Treaty that relate to climate change include:

- the obligation to involve all the interested parties in the management of the water resource and the decision-making process. (Principle 4)[1571]
- the obligation to safeguard the environment and to ensure the sustainability of the ecological equilibriums as well as the natural hydrologic processes. (Principle 6) [1572]
- the obligation for each contracting state to inform the other states before undertaking any action or any project that could have a substantial impact on the availability of the waters and/or the possibility for implementation of projects in future. (Principle 7) [1573]
- the user-buyer principle, applied to the uses of waters for economic purposes (Principle 6) [1574]

[1571] Articles 4 and 5.1. of the 2007 CICOS Additive Treaty.

[1572] *Ibid*.

[1573] *Ibid*.

[1574] *Ibid*.; Full version of Article 4 of the CICOS Additive Treaty is available in french at: *http://extwprlegs1.fao.org/docs/pdf/con144671.pdf*, accessed on 30 April 2019.

Although these principles were primarily concerned with integrating the IWRM approach, they have some degree of compatibility with climate change; that is why their observation will appear crucial from a climate change viewpoint.[1575]

Principle 4, for example, on the "obligation to involve all the interested parties in the management of the shared water resources and the decision-making process" is an essential procedural obligation.[1576] As discussed earlier,[1577] this obligation is comprised of the principles of cooperation and the duty to share information, and the duty to notify and consult the other riparian states before any significant initiative that may have a transboundary impact.

The sharing of information on transboundary watercourses is generally one of the first steps towards the establishment of state co-operation in a river basin.[1578] However, here is one crucial factor that will need much often to be taken into account regarding the implementation of these principles: States, as Gross agues,[1579] are often reluctant to share information, including water information, depending on their national contexts and circumstances. States would want to know what kind of information to share and to what extent should they share it. The Regime of the 1997 UNWCC does not put any obligation on the states parties to share a type of information or data which a state would consider to be strategic and therefore reluctant to publish.[1580] Article 1 of the 1997 UNWCC provides:

> "Nothing in the present Convention obliges a watercourse State to provide data or information vital to its national defence or security. Nevertheless, that State shall cooperate in good faith

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[1575] On the legal principles relating to climate change, see generally H.A. Strydom 'The Legal Principles Relating to Climate Change' (2010) *EOLSS*, 1-10.

[1576] J. Brunnée Procedure and substance in international environmental law: Confused at a higher level? (2016) 5 *ESIL* 1, 3.

[1577] See sections 4.3.5 and 4.3.6 above.

[1578] See section 4.3.4 above; McCaffrey (d) (note 388 above; 85).

[1579] O. Gross 'Cyber Responsibility to Protect: Legal Obligations of States Directly Affected by Cyber-Incidents (2015) 48 *C Int'l L J* 481, 481.

[1580] See section 4.3.5.1 above; see also Article 31 of the 1997 UNWCC.

with the other watercourse States with a view to providing as much information as possible under the circumstances."[1581]

The Convention therefore only creates a narrow exception for data and information 'vital' to a State's national defence or security'. States are required to cooperate "in good faith" with the other riparian states so as to provide them with the as much information as possible, that will reflect their good faith with respect to the circumstances that require such information to be made available. However, as it will be discussed below, the lack of precision and guidelines for the implementation of a transboundary water regime, plus the lack of political will, and financial resources to generate and share water information can become a significant threat to the success of such a regime across a river basin.[1582]

9.2.4 Flexible strategies for water allocation and water quality standards

9.2.4.1 Flexible strategies for water allocation

Water allocation is defined as "the process of distributing water supplies to meet the various requirements of a community".[1583] In transboundary contexts, *water allocation* can mean "the process of allocating water supplies to meet the needs and requirements of the different riparian states of a single watercourse".

As discussed earlier, it is only in certain types of contexts that the negotiation of mechanisms for water allocation becomes crucial among the riparian states (section 7.1.2). These contexts include limited water resources, water shortages, droughts and high water demands from riparian countries in comparison to the available waters across the river basin. In general, all of these contexts predispose parties to compete over water resources. To avoid water competition requires the definition of water allocation mechanisms between the riparian states.

In the Congo River basin, water availability is generally greater than water demand. The basin's average of available freshwaters per capita is 20,014 cubic meters per

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[1581] Article 31 of the 1997 UNWCC.

[1582] Sonoda (note 1572 above; 236).

[1583] See note 1289 above.

habitant per year.[1584] The World Bank estimates the water stress index across the Congo River basin to be around 1.557 on average.[1585] The index suggests that the countries of the Congo River basin have abundant water resources from which they only withdraw a little. Issues regarding water allocation are, therefore, not addressed in the CICOS regime. The water stress index calculates the rate of freshwater withdrawal as a proportion of available freshwater resources.

In water-rich contexts, there is generally no need to engage in the definition of water allocations; that is why water treaties signed in these environments often address other issues than water allocation.[1586] Hamner & Wolf[1587] also noticed that only a few treaties addressed water allocation, and attributed such a gap to the intensely political nature of water allocation between the states. There are some cases where water treaties have conditioned the definition of any water allocation mechanism. The treaty between Canada and the United States of America of January 17, 1961, for instance, relating to Cooperative Development of the Water Resources of the Columbia River Basin refrained from defining

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[1584] See World Bank 'Renewable internal freshwater resources per capita (cubic meters)' available at *https://data.worldbank.org/indicator/ER.H2O.INTR.PC,* accessed on 17 July 2019. The average of available freshwater water at the global level is 5,929.861 cubic meters per person per year. The maximum of water availability per capita per year is held by Greenland (10,662,187 per person per year), wherea the minimum is held by the United Arabe Emirates (16 cubic meters per person per year). On average, the demand for water resources is around 140 cubic meters per person per year. The smallest national average of available waters in the Congo River basin is found in Rwanda (857 cubic meters per person per year), whereas the biggest is found in the Republic of the Congo (46,836 cubic meters per person per year). See for further details: *https://www.phila.gov/water/educationoutreach/Documents/Homewateruse_IG5.pdf*, accessed on 17 July 2019.

[1585] World Bank 'Level of water stress: freshwater withdrawal as a proportion of available freshwater resources' (2019) Information available at *https://data.worldbank.org/indicator/ER.H2O.FWST.ZS*, accessed on 18 May 2019.

[1586] For example, 36 multilateral or bilateral treaties were signed and that concerned the Amazone and Congo River basins from the 1885 Berlin Final Act to the Convention on the Sustainable Management of Lake Tanganyika of June 12, 2003. Out of these 36 treaties, there was non of them that dealt with water allocation. Information available at *https://transboundarywaters.science.oregonstate.edu/content/international-freshwater-treaties-database,* accessed on 18 May 2019.

[1587] Hamner & Wolf (note 341 above; 56).

any mechanism of water allocation between the two signatories, except for some reasons such as power generation and flood control.[1588]

Although the first part of these authors' affirmation is correct and is based on facts, their interpretation of the facts seems flawed because it has considered water availability only from a scarcity viewpoint. Water scarce contexts, as already discussed, are the contexts that favour water competition, and because of that, the hydropolitics of the basin often complicates and politicise the signing of water treaties.

However, even if the CICOS regime failed to explicitly address water allocation issues, it has laid the foundations for future developments that may lead to the definition of water allocation mechanisms within the part of the basin under the jurisdiction of the CICOS. In fact, Article 9 of the 2007 CICOS Additive Treaty provides:

> "The contracting States, based on a proposal from the Commission, shall determine the priorities between the water demands of the different users, according to their needs and according to the availability of the resource, taking into account the good hydrological functioning of wetlands and the preservation of ecosystems: No user is immediately prioritized over others in accordance with the principles of integrated water resources management and those of international law. In situations of water shortage, priority will be given to the supply of drinking water for domestic needs, livestock, and the preservation of aquatic ecosystems."[1589]

[1588] See article IV of the Treaty between Canada and the United States of America relating to Cooperative Development of the Water Resources of The Columbia River Basin of January 17, 1961, treaty available at *http://extwprlegs1.fao.org/docs/pdf/bi-145062.pdf* , accessed on 18 May 2019.

[1589] Article 9 of the 2007 CICOS Additive Treaty (the original french version) stipulates: "Les Etats contractants, sur proposition de la Commission, déterminent les priorités entre les demandes en eau des différents utilisateurs, en fonction de leurs besoins et en fonction de la disponibilité de la ressource, en tenant compte du bon fonctionnement hydrologique des zones humides et de la préservation des écosystê"m_s:s. Aucun usager ne bénéficie d'emblée d'une priorité par rapport aux autres, conformément aux principes de la gestion intégrée des ressources en eau et à ceux du droit international. Toutefois, en cas de situation de pénurie, la priorité sera accordée à l'approvisionnement en eau potable pour les besoins domestiques, l'élevage, et à la préservation des écosystèmes aquatiques."

The above stipulation is the only provision of the CICOS regime to directly provide for the uses of the waters of the basin in quantity terms.

Under this provisions, the CICOS regime enjoins its country parties to determine their priorities in the event of water demands from different water users, taking into account the availability of the resource, which a due consideration to the needs of the other states of the basin. [1590] No user is prioritized over the others. The provision also creates an obligation to states to consider the commission's proposal (which is the CICOS) in doing so. The provision further insists that states' decisions on water priorities have to be done taking into account the hydrological functioning of wetlands as well as the preservation of ecosystems in good and stable conditions of functioning.[1591] Under the CICOS regime, no user is statutorily prioritized over the others in accordance with the principles of integrated water resources management and those of international law". [1592]

Moreover, the provision stipulates that "in situations of water shortage, priority will be given to the supply of drinking water for domestic needs, livestock, and the preservation of aquatic ecosystems."[1593] If in the future, the member states of the CICOS have to determine the priorities between the water demands that will come from the different water users. It most probably means that the way is opened for a future definition of water sharing mechanisms, whether at national or at river basin levels. As specified by Speed,[1594] the determination of water priorities leads to the definition of water allocation strategies. It is almost sure that there will not be indefinitely enough waters to satisfy all the needs across the Congo River basin. Cases such as the Tigris and Euphrates, or the Indus River basins are appropriate examples where water allocation keys between the states and the different water users were decided.[1595]

[1590] Article 9 of the 2007 CICOS Additive Treaty.

[1591] *Ibid.*

[1592] *Ibid.*

[1593] *Ibid.*

[1594] R. Speed *et al.* Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning (2013), 27.

[1595] *Ibid.*; For details on water allocations across both river basins, see N. Al-Ansari 'Hydro Geopolitics of the Tigris and Euphrates' (2019) In *RR in E & Envi Sc* 35-70; S. Glass 'Twisting the Tap: Water Scarcity and

The CICOS regime has further required its state parties to take into account, in all their projects as touching the Congo watercourse, the hydrological functioning of wetlands, and the preservation of ecosystems of the whole Congo watercourse.[1596] This will probably suggest an evaluation of the overall need for waters for the sustainable functioning of these wetlands and ecosystems, which will, in turn, dictate the definition of some thresholds in the level of water withdrawals to be made by member states.

9.2.4.2 Water quality standards

The CICOS regime has shown itself more concerned regarding water quality issues than water quantity and allocation, as already discussed.[1597] Several provisions of the CICOS regime refer to water quality issues, even if they fail to provide for additional information to better define the quality referred to, or even to provide for some water quality standards for compliance across the region. Article 2, paragraph 2, for instance, provides:

> "The purpose of this Addendum is to promote the Integrated Water Resources Management in the area of competence of the Commission: through defining the procedures for the examination and approval of new projects that are likely to affect the quantity and quality of water."[1598]

Article 2, paragraph 2 of the 2007 CICOS Additive Treaty stipulates that the treaty aims at achieving the promotion of the Integrated Water Resources Management approach through, among other things, the definition of procedures for the examination and approval of new projects that are likely to affect the quantity and quality of the shared water resources.

Despite such a provision, the 2007 CICOS Additive Treaty failed to move further and provide for water quality standards, to which the member states would comply.

Conflict in the Euphrates-Tigris River Basin' (2017); M.R. Jarkeh *et al.* 'Developing new scenarios for water allocation negotiations: a case study of the Euphrates River Basin' (2016) 374 *Pof the Int'l Ass of Hydr Sc.* 9-15; M. Basharat 'Water Management in the Indus Basin in Pakistan: Challenges and Opportunities' (2019) *IRB* 375-388.

[1596] See Article 9 of the 2007 CICOS Additive Treaty.

[1597] See section 6.3.2 above.

[1598] Article 2 paragraph 2 of the 2007 CICOS Additive Treaty.

The wordings of Article 2 instead suggests that member states will have to adopt these water quality standards in the future. Article 14, paragraph 1 provides:

> "Contracting States shall protect riparian ecosystems of the river and its tributaries, and manage the resource following natural equilibriums, including those of wetlands, using jointly their national laws and regulations and, in the case of necessity, the regulatory instruments available at the Commission."[1599]

The protection of riverine ecosystems required under Article 14 above relates to some extent to water quality. However, the treaty does not provide for any guidance concerning the standard protecting actions, which states are supposed to take, but limit itself to referring states to their national regulations, which they are later required to harmonise and apply jointly (in the same Article 14):

> "The Contracting States: Shall jointly establish the list of substances whose presence in the waters of the river and its tributaries must be monitored, limited or prohibited; Jointly define common objectives and criteria concerning the quality of water according to the uses which are made; Work together to develop techniques and to introduce effective water-saving and control practices against point or diffuse pollution; Work towards the harmonization of national legislation relating to water and the environment in the area of competence of the Commission."[1600]

Most of the countries that are a party to the CICOS regime lack adequate environmental protection laws and regulations that are in place. Moreover, in countries where such laws and regulations exist, it was only recently that they were passed, especially those that aim at protecting the environment, including the riverine ecosystems.[1601]

[1599] *Ibid*. Article 14 paragraph 1.

[1600] Article 14 of the 2007 CICOS Additive Treaty.

[1601] For instance, the DR-Congo enacted its national "Act n ° 14/003 of February 11, 2014 relating to nature conservation" (Original title in french: Loi n° 14/003 du 11 février 2014 relative à la conservation de la nature) only in 2014. Whereas the Republic of the Congo enacted its "national Act No. 37-2008 on Wildlife and Protected Areas" (Original title in french: Loi nº 37-2008 sur la faune et les aires protégées) in 2008. Information on the other countries of the basin are available at *https://www.ecolex.org/result/?q=&xcountry=Congo%2C+Dem.+Rep.+of&xdate_min=&xdate_max=&leg_type_of_document=Legislation* , accessed on 23 August 2019.

Even if all the member states have these laws and regulations in place, they will do so according to national standards, which may as well vary from one state to the other. Variance in standards will pose a problem for consolidation and harmonisation of actions in a later stage, thus suggesting a further concern in the CICOS regime.

The example from the European Union which was evoked earlier would perhaps be a timely lesson.[1602] In terms of general environmental standards, and more specifically concerning water quality standards at the river basin scale, a top-down approach would be advisable rather than a bottom-up approach. A top-down approach will imply directives and regulations formulated at the river basin level and to be applied at the state or sub-state levels, whether jointly or individually, depending on circumstances,[1603] whereas a bottom-up approach will imply directives and regulations formulated at the state or sub-state levels, and to be considered at the river basin level.[1604]

A similar observation can be made concerning Article 14, paragraph 2-3, under which the regime seems to limit itself in defining some "general recommendations", and instead places on the state members the responsibilities regarding the definition of factors relating to water pollution and water quality. Article 14 paragraph 2-3 provides:

> "The Contracting States undertake to regulate any action that is likely to change significantly the characteristics of the regime of the river, its tributaries and other associated wetlands, the health status of the waters, the biological characteristics and the diversity of its fauna and flora and, in general, its environment. For this purpose, they shall take measures to prevent, reduce or control events or conditions resulting from natural causes or human activities that may cause harm to other Contracting states, to the environment of the river, the health or safety of men."[1605]

[1602] See section 8.3.5 above.

[1603] For further analysis on both approaches in environmental law, see E.D Fraser 'Bottom up and top down: Analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management' (2006) *78*(2) *J of env mngmnt* 114-127.

[1604] *Ibid*. Fraser.

[1605] Article 14 paragraph 2-3 of the 2007 CICOS Additive Treaty.

9.2.4.3 Regime assessment

From the above analysis, it transpires that the CICOS regime is deprived of any flexible strategy for water allocation among its member states. Also, the regime refers to water quality standards but fails to adequately provide in that respect. Instead, the regime adopted a bottom-up approach, remitting to the member states the responsibility to jointly adopt the water quality standards to be implemented at the river basin level. Regarding flexible water allocation mechanisms, being that Article 9 of the 2007 CICOS Additive Treaty enjoins member states "to determine the priorities between the water demands of the different users "based on a proposal from the Commission",[1606] it will, therefore, remain to be appreciated which proposal the commission will draft, adopt and submit to member states pursuant to the provision of Article 9 above.

Nevertheless, the adoption of a flexible strategy for water allocation may stem from Article 9 above, depending on whether the CICOS' proposal will be drafted in absolute or relative terms, or if it will be limited to determining some thresholds of water withdrawals which the states will be enjoined to observe. A proposition that will be formulated in absolute terms will not meet this specific criterion, neither will a proposition that is limited to determining maximum levels of water withdrawal, unless if associated with some complementary mechanisms, which will provide for a certain level of flexibility so that states may adjust their treaty compliance in the case of significant changes in water availability. Only a proposition under which the mechanisms for water allocation will be formulated in relative or proportional terms may make the treaty meet the requirements of this first criterion of Cooley & Gleick, and thus contribute to the CICOS regime's responsiveness to climate change.

9.2.5 Response strategy for extreme events

9.2.5.1 Context presentation

The second criterion of Cooley & Gleick is the treaty responsiveness to extreme events. An extreme event is defined as "an event that is rare at a particular place and time of year".[1607]

[1606] *Ibid*. Article 9.

[1607] IPCC (2014) (c) (note 10 above; 1765).

A strategy is generally defined as the skill of planning for situations.[1608] In other words, Cooley's second criterion seeks in a treaty, the appropriate skill mechanisms that show a treaty's preparedness for the extreme events associated with climate change.

> Article 7 of the 2007 CICOS Additive Treaty provides:
>
> "The modalities of use of the waters are assessed based on the availability of the resource:
>
> - the normal situation corresponding to the satisfaction of all the needs;
> - the emergency corresponding to floods or other natural or accidental disasters;
> - the situation of shortage, corresponding to a period of unavailability of the resource, totally or partially, generally or localised, due to natural or accidental reasons not imputable to the conditions of management of the water resources. In the two last cases, the Commission is notified without delay by the State that undergoes such a situation. However, if a State is under obligation to take emergency measures unilaterally, it will immediately inform the other States and the Commission."[1609]

This provision of the CICOS regime enumerates situations that can be considered as disastrous or "extremes", including floods and other accidental disasters, which the treaty did not specify with much clarity. Floodings are presented as "emergencies" that may affect water availability across the region, rather than being treated as a permanent recurring phenomenon. Since floods and other extreme events are viewed as emergencies, the CICOS regime has limited itself in instituting a transversal regime to deal with them. This regime is mainly an informative one, without any measure for extreme event management.

This is what the CICOS regime says in substance "In the two last cases (referring to the emergency corresponding to floods and other natural or accidental disasters),[1610] the Commission is to be notified without delay by the State that undergoes such a situation. In other words, nothing is planned by the regime, in terms of event

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[1608] available at *https://dictionary.cambridge.org/fr/dictionnaire/anglais/strategy*, accessed on 18 May 2019.

[1609] Article 7 of the 2007 CICOS Additive Treaty.

[1610] The CICOS regime is here referring to the emergency that corresponds to floods and other natural or accidental disasters, and to situations of shortage, corresponding to a period of unavailability of the resource, totally or partially, general or localised, due to natural or accidental reasons not imputable to the conditions of management of the water resources.

prevention or management, but a state that undergoes such an extreme situation has to notify the Commission. In the same order of idea, a State that is under obligation to take emergency measures unilaterally is enjoined to inform the other states of the basin and the Commission.

As understood while analysing the flood management regime of the Rhine River basin,[1611] technical studies may consider that optimal protection of a downstream state from floods may be reached only if the building of flood prevention structures occurs in another state other than the state that is exposed to the flood. In such circumstances, states may need to sign treaties to permit the storage of excessive rainfall on the territory of an upstream riparian, in order to protect a downstream one.

The CICOS regime seems, in this case, inappropriate because states that find themselves in such a situation do not find support in neither one of the CICOS Treaties and will have to be "build from scratch" and negotiate bilateral instruments that will result in creating such rights. Likewise, in a case of a necessity to create water storage structures for flood control or drought mitigation or any other extreme event, the provision does not give adequate support to member states, and these may have to depend on bilateral treaties.

9.2.5.2 Regime assessment

From the above analysis, it transpires that the CICOS regime is not adequately equipped with a strategy response for extreme events as per *Cooley & Gleick's criteria framework.* Article 7 above, of the 2007 CICOS Additive Treaty is the only provision of the regime that seemingly provides for extreme events, and only for cases related to water use modalities in the event of floods and droughts.

9.2.6 Amendment and review process

9.2.6.1 Context presentation

The term "amendment" refers to a formal alteration of one or more provisions of a treaty, that affects all its parties.[1612] As discussed earlier, the amendment of a treaty can become smoother thanks to the incorporation of a "built-in mechanism" that provides for a more

[1611] See Section 8.3.4 above.

[1612] See Article 40 of the Vienna Convention of the Law of Treaties of 1969.

relaxed amendment process.[1613] Climate-proofing water treaties require the incorporation of such built-in mechanisms because they offer signatory states enough flexibility in order to adapt in case of any significant changing conditions.

Article 22 of the 2007 CICOS Additive Treaty provides, "This additive may be amended in the same conditions as the Agreement, as defined in Article 32." The agreement referred to (the agreement establishing a uniform regime of navigation on the Congo River and its Ubangi and Sangha tributaries, and creating the International Commission of the Congo-Oubangui-Sangha Basin of 1999) provides:

> "Any proposed amendment to this agreement shall be submitted in writing to the Secretary-General, who shall transmit it to the member States within thirty (30) days of its receipt. Comments on the proposed amendment are addressed to the Secretary-General in the following thirty (30) days. At the end of this period, the Secretary-General submits to the Committee of Ministers the proposed amendment as well as the comments thereon. Any amendment to this agreement shall be adopted by the Committee of Ministers before it enters into force."[1614]

The CICOS regime recognises the right of the member states to take the initiative to request a treaty amendment. Nevertheless, the regime does not specify the motives that could lead a state to require such an amendment. Will a treaty amendment request by a state address the entire Congo watercourse, or will it only attain to the state's national interests? These are the categories of questions the CICOS regime fails to provide adequate answers for.

9.2.6.2 Regime assessment

Article 22 of the 2007 CICOS additive treaty shows that the CICOS regime has a built-in mechanism, which provides for smoother treaty Amendment or reviews. It can be concluded, therefore, that the amendment and review process of the CICOS regime meets Cooley & Gleick's third criterion, which relates to the inclusion in treaties provisions of some flexible amendment and review processes. Also, the fact that the joint commission plays a significant

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[1613] See section 7.1.4 above.

[1614] Article 32 of the agreement establishing a uniform regime of navigation on the Congo River and its Ubangi and Sangha tributaries, and creating the International Commission of the Congo-Oubangui-Sangha Basin of 1999.

role in the treaty amendment process can be seen as a constructive aspect of the CICOS regime, as it gives more effectiveness and power to the joint commission as per Cooley & Gleick's next criterion, which sought for actively involved joint commission in river basins matters.

9.2.7 Joint institutions

9.2.7.1 Context presentation

The 1999 CICOS initial Treaty established the International Commission of the Congo-Oubangui-Sangha Basin (CICOS). The CICOS was established as a joint organisation vested with specific statutory powers over the waters of the Congo, the Sangha, and the Ubangi Rivers as per its Article 16 and 17 (section 6.2.5.2). The initial mandate of the CICOS Commission, as discussed earlier, was focused on navigational matters,[1615] which mandate was reinforced by the 2007 CICOS Additive Treaty. Under the CICOS Additive Treaty, the mandate of the CICOS was extended to defend the interests of the riparian states of the Congo River.[1616] Such mandate extension was necessary because the states of the basin needed a buffer institution that would perform some preliminary activities such as the negotiations or information sharing across the basin, in the event of major water projects such as water transfer or water exportation.[1617]

The following provisions illustrate the will of the state members of the CICOS regarding the operationalisation of the CICOS as a joint institution. Article 11 of the 2007 CICOS Additive Treaty provides:

> "Examination of applications for authorisation, their issuance, as well as the registration of declarations, are of the jurisdiction of the contracting States. However, projects that are likely to have significant impacts on shared waters referred to in Article 19 and defined in the nomenclature provided for in Article 10

[1615] See section 6.2.5.2 above.

[1616] See the Preamble of the 2007 CICOS Additive Treaty.

[1617] Medinilla (note 951 above; 10).

above, must be the subject of an opinion from the Commission and a consultation of the other Contracting States before their authorisation."[1618]

This provision gives authority to both the CICOS and the contracting states of the basin to participate and emit an opinion that is favourable or unfavourable for every project that one state may conceive, and that might cause significant impacts on the water resources of the basin.

Such primacy in the recognition of the right to participate in the decision process regarding the waters of the Congo River basin to the CICOS first, and then to the individual member states of the basin is the expression of the will of the countries party to the CICOS to jointly manage a significant issue regarding the basin's water resources. Article 19 of the 2007 Additive also provides for similar matters:

> "Under the provisions of Article 8 of the Agreement, relating to works and structures, no project likely to modify significantly the characteristics of the shared waters: regimes, airworthiness, operability, quality, health status, biological diversity may be executed without first being approved by the signatory states. An obligation of information and mutual consultation binds the parties, regarding the possible impacts of these projects. To that end, projects that are submitted to authorisation according to the nomenclature of Article 10 are classified into three categories:
>
> 1) Projects that are likely to significantly impact on two or more signatory states;
> 2) Projects that do not have any significant impact outside the territory of the signatory states that authorise them;
> 3) Projects that are derogatory."[1619]

In support of the joint character of some of the operations, the 2007 Additive treaty obliges member states to share any information they may hold regarding the Congo watercourse,

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[1618] See Article 11 of the 2007 CICOS Additive Treaty; The original french version: "L'instruction des dossiers de demande d'autorisation, leur délivrance, ainsi que l'enregistrement des déclarations, sont de la compétence des Etats contractants. Toutefois, les projets susceptibles d'avoir des impacts significatifs sur les eaux partagées, visés à l'article 19, et définis dans la nomenclature prévue à l'article 10 ci-dessus, doivent faire l'objet d'un avis de la Commission et / ou d'une consultation des autres Etats contractants avant leur autorisation."

[1619] *Ibid*. Article 19.

without prejudice to the provisions of its Article 31 evoked earlier.[1620] It further obliges them to engage in mutual consultations regarding projects that are likely to cause significant impacts on two or more contracting states.[1621]

As concludes Medinilla,[1622] Article 19 above constitutes one of the most critical provisions of the treaty. It institutes the practice of jointly managing the basin's water resources, which are faced with large infrastructure projects such as some climate change-related inter-basin water transfer as already mentioned.[1623] However, regarding this particular point, the fact that the CICIOS regime requires that some major water projects may be decided at member states' level, but others not, may pose a critical issue of treaty interpretation in future.

It is more likely that providing more details and specificities regarding which category of the project would fall under states' competency and which would not could certainly be a better alternative. In other words, which standard threshold do member states have in order to decide on whether a project should depend or not on state authorisation? Moreover, from which threshold do they decide which projects fall in the ambit of the CICOS (or of the co-riparian states for a review) as provided in the regime? Also, on which basis the other co-riparian states may oppose a state's unilateral decision to allow a water project?

The CICOS regime indeed proclaims all these aspects but fails to provide further specifications, suggesting a regime gap in terms of treaty predictability. Climate change brings uncertainty, and it should not be advisable to treaties that deal with this phenomenon to comprise themselves some dosage of uncertainty, apart from the aspects that are dealt with under Cooley & Gleick's criteria, and that aims at ensuring to treaties the necessary flexibility. The fact that the CICOS regime lacks specificity in these critical matters leaves ample space for uncertainty and speculation, which is against the spirit of joint management.[1624]

[1620] See section 4.3.5.1 above.

[1621] See Paragraph 2 of Article 19 and paragraph 2 of Article 11 of the 2007 CICOS Additive Treaty.

[1622] Medinilla (note 951 above; 10).

[1623] See section 5.6.2 above.

[1624] See section 4.2.5 above; see also section 4.3.4.

9.2.7.2 Regime assessment

From the above analysis, it appears that the CICOS regime is equipped with a joint mechanism. This mechanism ensures that the basin's water resources are unilaterally managed only up to a certain threshold, beyond which there is a necessity to consult the other parties for joint resource management. However, the regime generally failed to specify such thresholds, making ambiguous the operationality of the provisions that call for a consultation of the other parties for the joint management of shared water resources.

9.2.8 Concluding thoughts on climate change and the CICOS regime

Under climate change circumstances, it is strongly recommended that transboundary water treaties may integrate flexible mechanisms for dealing with the many issues that are associated with shared water resources at the transboundary level.[1625] One should operate a careful choice in order to select the most appropriate mechanism among all those discussed above,[1626] or even associate more than one mechanism, in order to ensure greater treaty flexibility and adaptation to climate change. Efficient choices lay within the ambit of the negotiating states; yet, the adequacy of a mechanism will strongly depend on the treaty purpose, and on the overall context that characterises the water body for which the treaty is being negotiated.[1627]

Due to the diversity of contexts, a method that will fit one context may not fit the other forcibly. A method that would be relevant in addressing water variability in drought-prone contexts, for instance, may not be effective in flood-prone contexts and vice versa. Therefore, the climatic and hydrological context of a river basin will be highly determining in the choice of which mechanism should be put in place in order to ensure water treaty flexibility in the face of climate change.

In the case of the Congo watercourse, choices will be guided by the predictions that were made about the basin and those that were discussed above, according to which climate change would cause excessive waters during wet seasons.[1628] The outcome of water treaties in this context should address anticipatively the issue of how the individual

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[1625] See chapter 7 above.

[1626] *Ibid*.

[1627] McCaffrey (f) (note 1318 above; 159-160).

[1628] See section 5.6.1 above.

riparian states of the Congo watercourse will adapt to the changing conditions of water availability across the basin, in order to ensure more regime stability.

A further thought concerning climate change and the CICOS regime relates to the inclusion of supplementary instruments in the arsenal of the basin. Apart from the 1999 CICOS initial Treaty and the 2007 CICOS Additive Treaty, adaptation to climate change for the shared water sector of the basin will be better achieved through the adoption of specific and detailed supplementary instruments, such as subsequent protocols, vertical programmes, or even action plans that the member states are urged to adopt depending on the circumstances. Article 14 of the 2007 CICOS Additive Treaty enjoins member states to adopt supplementary instruments including regulation texts in order to achieve the objective of the Commission. The legal framework for flood management in place in the Rhine basin which will be discussed in the next section offers an eloquent example, of regime improvement through the adoption of specific complementary instruments.

9.3 A comparative analysis of the legal regimes for flood management in the Congo and the Rhine River basins

9.3.1 General considerations

At first glance, the nuances between the two regimes may look obvious because they present minimal similarities against enormous differences. From a comparative viewpoint, however, the analysis of both the similarities and the differences is worth being undertaken because it is the way of identifying the gaps in the flood management regime that is in place in the Congo River and its transboundary tributaries, as it will be necessary to improve it. The similarity between the two regimes stems from the connection they both have with 1997 UNWCC. The two regimes seem to have adhered to the core principles of the 1997 UNWCC.[1629] Some other differences between the two regimes come from the fact that the Rhine River regime is equipped with a specific instrument that deals with floods, whereas the CICOS regime has no such an instrument.

The 1997 UNWCC is a framework treaty that approaches floods only in a broad way, as one of the emergencies identified by the treaty, without any operational

[1629] On the principles of the 1997 UNWCC, see section 4.3 above and its associated notes.

specifications, and therefore with little practical usefulness.[1630] The difference between the two regimes stems from the fact that the Rhine River basin is equipped with an instrument that deals specifically with floods. This specific instrument dedicated to floods complements the general instruments that are also applicable to flood issues, such as the 1997 UNWCC.

Unlike the Congo River basin, which has limited experience with floods, the Rhine has suffered from floods for centuries,[1631] and has thus accumulated a long flood management experience, which the basin has communicated to the European Union during the drafting of the 2007 Flood Management Directives.[1632] Although the 2007 EU Flood Management Directive is a regional instrument and has, because of that, included several other river basins' experiences, the Rhine's contribution has been recognised in particular for the drafting of the flood management regime that is applied across the European Union.[1633]

In both river basins, the regimes for flood management are drawn from two categories of instruments, namely the general and the particular instruments. While the Rhine regime has evolved and is comprised of both the specific and the general instruments in order to deal with floods, the regime in the Congo River has remained rudimentary and is comprised of only a few general instruments. The CICOS regime addresses flood under these general provisions. Table 13 below overviews the main general instruments of both river basins.

[1630] Article 28.1. of the the 1997 UNWCC provides as follow: "For the purposes of this article, "emergency" means a situation that causes, or poses an imminent threat of causing, serious harm to watercourse States or other States and that results suddenly from natural causes, such as floods, the breaking up of ice, landslides or earthquakes, or from human conduct, such as industrial accidents."

[1631] See section 8.2.2 above.

[1632] *Ibid*.

[1633] See section 8.2.2 above.

Table 13: The General instruments which are referred to
by the regimes of the Rhine and Congo River basins for flood management

Parameter of comparison	The Rhine River basin	The Congo River basin
Reference to General Instruments	1.The Convention on the Protection and the Use of Transboundary Watercourses and International Lakes of 1992; 2. The UN Convention on the Non-navigational uses of International watercourses of May 21, 1997 UNWCC;[1634] 3. The Convention on the Protection of the Rhine of April 12, 1999; 4. The European Water Directive of October 23, 2000.[1635]	1. The UN Convention on the Non-navigational uses of International watercourses of May 21, 1997 UNWCC. 2. The 1999 agreement establishing a uniform regime of navigation on the Congo, the Sangha, and the Ubangi Rivers, and creating the International Commission on the Congo, Ubangi and Sangha Rivers.[1636] 3. The 2007 CICOS Additive Treaty.[1637]

Source: This thesis' own compilation.

From the summary provided by table 13 above, it is understood that the Rhine River flood management regime is drawn from about four main general instruments, whereas the Congo regime is drawn from three. Some of these general instruments are framework instruments that provide for a range of issues in which floods are only a part of. Framework instruments, as specifies Bodansky,[1638] are procedural by destination and do not address specific matters in depth. They aim to create the appropriate legal framework under which more substantive and concrete instruments would be adopted, such as protocols, directives or others, for the achievement of the objectives of the framework

[1634] See section 4.4 above.

[1635] See section 8.2.5.3 above.

[1636] See section 6.2.5.2 above.

[1637] See section 6.2.5.2 above.

[1638] D. Bodansky & L. Rajamani (e) 'The evolution and governance architecture of the climate change regime. International Relations and Global Climate Change: New Perspectives' (2016) 2nd Ed. Forthcoming, 11.

instrument.[1639] Provision for floods with much in-depth and details would have caused these instruments to lose their framework character.[1640]

The next section will analyse first the similarities, and then the differences between the two regimes, and after that, discuss some relevant particularities that are associated with the regime comparison that will be undertaken.

9.3.2 Regimes similarity

The similarity between the two regimes comes mainly from the 1997 UN Convention on the Non-navigational uses of the International watercourses, which is the only multilateral instrument that both regimes have related to as far as floodings are concerned. The Preamble of the 1999 CICOS Initial Treaty, for instance, refers to the 1997 UNWCC and declares the CICOS treaty's willingness to comply with the regime which is under the 1997 UNWCC. Article 27 of the 1997 UNWCC on the Prevention and mitigation of harmful conditions provides:

> "Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification."[1641]

This Article 27 is the only written express reference to flood in the entire body of the 1997 UNWCC. This provision lays an obligation on watercourse States to individually, or wherever appropriate to take jointly all the appropriate prevention or mitigation measures that are related to a transboundary watercourse to avoid harmful activities to other watercourse states that may result in floods and the like.[1642]

[1639] E.R. Korhola *The rise and the fall of the Kyoto Protocol* (Unpublished LLM thesis, University of Helsinki, 2014), 47. Available at *https://helda.helsinki.fi/bitstream/handle/10138/136507/Therisea.pdf,* accessed on 02 February 2019.

[1640] McCaffrey (j) (note 289 above; 20).

[1641] Article 27 of the 1997 UNWCC.

[1642] *Ibid*.

Both regimes seem to have taken into consideration this provision, as they all provide for the avoidance of floods that may occur in a state B as a result of activities that are undertaken in a state A. For instance, Articles 11 and 19 of the 2007 CICOS Additive Treaty and Article 7.4 of the EU 2007 Flood Management Directive provide in the same sense as Article 27 above.[1643]

Besides the above general instruments, both river basins have specific conventions that are applicable only on any one of them. The Convention on the Protection of the Rhine of April 12, 1999, applies only to the Rhine River, whereas the two CICOS conventions apply to the parts of the Congo River and its tributaries which are covered by both CICOS treaties.[1644] All of these instruments contribute to the formation of the flood regime in each of these basins. Article 3 of the Convention on the Protection of the Rhine river, for instance, recognises in broad terms, flood as one of the issues on which the convention would be focused on, whereas Article 7 (2) of the 2007 CICOS Additive Treaty approaches floods as an emergency.

9.3.3 Regime differences

The differences between the CICOS regime and the Rhine regime come mainly from the 2007 EU Flood Management Directives, which is an instrument that specifically governs flood issues

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[1643] See Articles 11, 19 of the 2007 CICOS Additive Treaty; See also Article 7.4 of the EU 2007 Flood Management Directive. Apart from Article 27 of the 1997 UNWCC, the flood regime that applies to the Rhine River has also complied with Article 11 (1) of the 1992 UNECE Watercourses Convention, which is the second applicable general scoped-multilateral treaties, that has addressed floods in broad terms. Article 11 of the 1992 UNECE Watercourse Convention puts an obligation on the riparian states of transboundary watercourses to establish and implement joint programs that aim at monitoring the conditions of the transboundary watercourse, including floods and ice drifts, and monitor the likelihood of transboundary impacts from such watercourse; See Articles 11, 19 of the 2007 CICOS Additive Treaty; See also Article 7.4 of the EU 2007 Flood Management Directive.

[1644] On the parts of the Congo River that is covered by the CICOS treaties, the 2007 CICOS Additive Treaty has extended both the mandate and the territorial application of the CICOS as a basin organisation. Article 1 (15) of the the 2007 CICOS Additive Treaty provides "Territory of competence of the Commission" means: “the whole parts of the Congo river basin located in the territories of the contracting States.” (The original french is « Territoire de compétence de la Commission » : “l'ensemble des parties du bassin hydrographique du fleuve situées sur les territoires des Etats contractants.”).

across the Rhine River basin.[1645] The CICOS regime has not yet adopted such an instrument. Under the 2007 EU Flood Management Directives, the Rhine's regime has implemented concrete and substantial flood management procedures that are likely to inspire the design of flood management regimes for other river basins. Table 14 below provides a summary of the specific instruments that are designed to address flood in both regimes.

A second instrument to be mentioned concerning the Rhine River regime is the 2000 EU Water Directives. The 2000 EU Water Directives contain some provisions that contribute to the flood management regime. Its Articles 2.15 and 3.1, for instance, are referred to in the obligation to establish flood risk management plans as per Articles 6, 7 and 8 of the 2007 EU Flood Management Directives.[1646] The 2000 EU Water Directives is indeed a specific instrument if approached from a water resources perspective. It becomes a general instrument if approached from a flood perspective, as it is the case under the Rhine River flood regime.[1647]

Table 14: Specific instruments and provisions
to address flood in the Rhine and Congo River basins

Parameter of comparison	The Rhine River basin regime	The Congo River regime
Existence of a specific instrument that addresses flood issues.	*The EU Flood Directives of October 23, 2007.*	There is no flood specific instrument in place.
Existence of an obligation to conduct preliminary flood risk assessments.	*The 2007 EU Flood Directive Management.* Article 3(2) (b), Article 4, Article 6 (1), (2), (3); 10 (2).	This obligation does not exist.
Existence of an obligation to prepare flood hazard maps and flood risk maps.	*The 2007 EU Flood Directive Management.* Articles 6 (1), (2), (3) create an obligation to prepare flood hazard maps and flood risks.	This obligation does not exist.
Existence of an obligation to establish flood risk management plans.	*The 2007 EU Flood Directive Management.* Article 3(2) (b), Article 5(1), Article 6, Article 7.1, Article	This obligation does not exist.

[1645] See section 8.3.5 above.

[1646] See section 8.3.5.4.2.

[1647] Explain the nuances between the general instruments and the specific instruments.

Parameter of comparison	The Rhine River basin regime	The Congo River regime
	8, Article 13 (1) (b), Annexe A (II). *The 2000 EU Water Directives* Article 2.15, Article 3.1.	
Existence of an obligation to exchange information and consult the other riparian states in case of significant water projects.	*The 2007 EU Flood Directive Management.* Article 4(3), Article 5(1), Articles 6, 9, and 14.	This obligation does not exist.
Review mechanism	The 2007 EU Flood Directive Management; Article 14.	This obligation does not exist.

Source: This thesis' own compilation.

The regime which is defined by the 2007 European Floods Management Directives, and the 2000 EU Water Directives which is applied in the Rhine River basin is regarded as one of the most elaborated flood management regimes worldwide.[1648]

Having the most advanced regime for flood management, in comparison to the Congo River, the Rhine's regime will offer the necessary parameters for regime comparison. In other words, the analysis of the differences between the two regimes will practically revolve around the enumeration and analysis of the characteristics of the flood management regime in place in the Rhine River basin and after that discuss their application in the Congo River basin. Being that section 8.2.5.4 above already described some of the characteristics that will be evoked in this section, the analysis to undertake here will, therefore, be oriented towards discussing the applicability of the Rhine flood management regime in the Congo River basin.

Rhine's flood management regime can be summarised as follow:

i. the obligation to conduct a preliminary flood risk assessment;

ii. the obligation to prepare flood hazard maps and flood risk maps;

[1648] The regime defined by the 2007 European Floods Management Directives, and the 2000 EU Water Directives, regarded as one of the most elaborated flood management regime worldwide does not apply on the Rhine River alone but also on the entire European Union space.

iii. the obligation to draft flood risk management plans;

iv. the obligation to exchange information and to consult;

v. the obligation to review mechanisms relating to flood management plans.

9.3.3.1 The obligation to conduct preliminary flood risk assessments

Article 4 of the Flood Directive creates an obligation for riparian states to undertake a preliminary flood risk assessment "in each river basin district, or unit of management of an international river basin district lying within their territory."[1649] The flood risk assessment referred to in this section is to be undertaken at "river basin district" level, which means:

> "The area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) as the main unit for management of river basins."[1650]

As mentioned earlier, the concept of "river basin district" is an innovation of the EU Water Directive.[1651] As such, it is central in the Rhine River flood management regime.[1652] Because of the context differences that exist between the Rhine and the Congo Rivers, the concept of river basin district may not find the opportunity to be applied in the Congo basin. However, with a little readjustment, the concept can be transposed into the reality of the Congo River basin. If through the river basin district concept, one assumes that the aim of the EU was to split a single river basin into smaller natural units with the view of reaching an optimal operational unit for flood management, the equivalent of river basin districts could be in the Congo River basin what this thesis refers to as "sub-river basins", or even a "sub-sub-river basins", depending on the contexts.[1653]

States that are riparian of a single watercourse are required to cooperate and find these operational subdivisions for optimised flood management. In this sense, finding the optimal operational entity for flood management becomes part of the mandate of a

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[1649] See integral text of Article 4.1. of the 2007 Flood Management Directives in note 1418 above.

[1650] Article 2(15) and Article 3(1) of the EU 2000 Water Directives.

[1651] See sections 8.3.5.4.1 and 8.3.5.4.2 above.

[1652] *Ibid*.

[1653] Factors such as the size of a sub-river basin or a sub-sub river basin, its complexity, as well as its vulneraibility to floods may constitute the factors that will determin wheter a sub-river basin or a sub-sub river basin are to be viewed as the equivalent of a "river basin district".

preliminary flood risk assessment. Such finding has to be done from the start because many of the activities and actions in liaison with flood management may need further legal enablement, in case, for instance, the optimal unit for flood management is situated in a transboundary area.

The hydrographic descriptions of the Congo watercourse have been undertaken, and most of the basin's sub-river basins and sub-sub-river basins are identified.[1654] What is not yet done is the flood risk assessment, in the sense of the Rhine's basin regime, for reaching the level of drafting a plan for flood management. Articles 4, 5, and 6 of the 2007 EU Flood Management Directives provide for the organisation of the preliminary flood risk assessment. In the spirit of these provisions, the preliminary assessment has to include:

- Maps of the river basin district at the appropriate scale (including the borders of river basins, sub-basins, topography, land use, etc.); [1655]
- A description of floods, which (a) have occurred in the past, (b) had significant adverse impacts on human health, environment, cultural heritage, economic activity, and (c) for which the likelihood of similar future events is still relevant (including their flood extent and conveyance routes/assessment of adverse impacts);[1656]
- Depending on the specific needs of the Member State, an assessment of potential adverse consequences of future floods, taking into account as far as possibly other issues. These could include topography, watercourses and their hydrological/geomorphological characteristics, floodplains as natural retention areas, the effectiveness of existing human-made flood defence infra-structures, populated areas, areas of economic activity, and long-term developments (including the impacts of climate change on the occurrence of floods)."[1657]

The preliminary assessments of the vulnerability of a region to floods imply surveys, studies such as the undertaking of cost-benefit or cost-effectiveness analysis of the

[1654] See generally chapter 5 of this thesis.

[1655] Article 4.2.a of the 2007 Flood Management Directives.

[1656] *Ibid*.

[1657] *Ibid*. Articles 4.2.c, 4.2.d, and Articles 5 and 6; see UNECE *Transboundary Flood Risk Management: Experiences from the UNECE Region* (2009), 18.

necessary actions regarding flood, and the mapping floodplain.[1658] It also includes a history of past floods in the area, particularly those that had significant impacts on the considered area, with updated projections regarding the likelihood of future floods.[1659] In a flood-prone context such as the one climatic predictions says some parts of the Congo River basin will become, conducting preliminary flood risk assessments should be put on a high level of priority from both national and sub-national authorities. Flood risk assessments across the basin should not be an option but urgency for the states of a river basin for which there are predictions of a high likelihood of floods.

A recent report from the Rhine basin shows that all the country parties to the Rhine protection Convention had complied with this obligation and have completed preliminary flood risk assessments. In the Congo River basin, to undertake preliminary flood risk assessment seems to be urgent, because of the predicted impact of climate change in the region. Such assessment will help to identify zones of high, moderate and lower risks across the region in order to plan and organise for adequate answers.[1660]

Planning and responding to floods is indeed a time and resources consuming activity, which is best addressed preventively. Failing to plan for floods can reveal to be more devastating, time and resource consuming than planning and preparing ahead. This is all the truer in the densely populated urban areas of the Congo River basin, whereby floods will most probably not have the same consequences as in flood plains or in the forests or underpopulated rural contexts.

As mentioned earlier, climate change will cause floods to become more regular and intense, and sometimes happening in several locations of the Congo basin at the same time, depending on some hydrographical and topographical determinants.[1661] Cities such as Kinshasa in the DR-Congo are particularly exposed because they are characterised by predominant unplanned urbanisation, and by radical changes in land-use

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[1658] *Ibid*. UNECE at 15.

[1659] Article 4.2 of the 2007 Flood Management Directives.

[1660] *Ibid*. Article 6.4.

[1661] See section 5.6.1 above; H. Nasiri *et al*. 'An overview to flood vulnerability assessment methods' (2016) 3 (2) *Sust Wat Res Mngmnt* 331, 336.

patterns, urban sprawling and overpopulation.[1662] Also, they have poor watersheds management, whereas there are significant enlargements and aggravation of the surfaces that are impermeable.[1663]

Perhaps, a way of avoiding the difficulty that is associated with the phase of "compulsory" flood-risk evaluation in weak economies contexts, such as in the Congo River, could be to undertake sub-basin assessments instead of considering the assessment of a basin as a whole. Carrying sub-basin assessments could prove to be even much appropriate and relevant because most transboundary sub-basins of the basin involve only two or three riparian states. In this case, negotiating agreements on floods can be less restrictive than on the assumption that more states were involved. Treaties with fewer parties are generally easier to negotiate, sign, implement and monitor, in comparison to treaties with a bigger number of states.[1664]

The part of the Congo River basin under the CICOS regime comprises three transboundary sub-river basins, which are the Ubangi River, the Sangha River, and the Kasai. Early discussions revealed that not all the parts of the basin are exposed to floods with equal vulnerability.[1665] Approaching flood issues by sub-river basins could help focus on the most urgent ones. The findings reported above indicated that the highest regions at risk for floods in the Congo River basin are the regions surrounding the central cuvette, upwards the city of Kinshasa. Floods in such localisations will most probably have repercussions on the city of Kinshasa, which is situated downwards the designated flood-prone area. In this particular example, a flood risk assessment that focuses on sub-river basin will cover only the sub-basins of Kasai and Sangha Rivers, and to some extent the Lake Tanganyika, as well as the Ubangi and the Lualaba Rivers upstream.

[1662] Information available at *https://www.ingentaconnect.com/content/sabinet/account/2015/00000015/00000001/art00008* , accessed on 24 July 2019.

[1663] *Ibid*.; see also Nasiri (note 1607 above).

[1664] On treaty practices by states, whether bilateral or multilateral, see section 3.3 above.

[1665] See sections 5.2.5 and 5.6.1 above.

Studies on the Congo River basin are generally scarce, especially the up to date information on the basin's hydrology and hydrography.[1666] Much of the information that exists on the impacts of climate change on the waters of the Congo river are regional studies.[1667] Such a rarity of information and data on the basin suggest a need for much studies on the Congo River basin, sub-basins, and sub-sub basins.

9.3.3.2 The obligation to prepare flood hazard and flood risk maps

Article 6 of the 2007 Flood Management Directives creates an obligation to prepare flood hazard maps and flood risk maps in the Rhine River basin. Such provision which does not exist in the regime that is in place in the Congo River basin may appear crucial for the region and its inhabitants. Articles 6 of the 2007 Flood Management Directives provides:

> "1. Member States shall, at the level of the river basin district, or unit of management referred to in Article 3(2)(b), prepare flood hazard maps and flood risk maps, at the most appropriate scale for the areas identified under Article 5(1).[1668]
> 2. The preparation of flood hazard maps and flood risk maps for areas identified under Article 5 which are shared with other Member States shall be subject to prior exchange of information between the Member States concerned.
> 3. Flood hazard maps shall cover the geographical areas which could be flooded according to the following scenarios:
>
> (a) floods with a low probability, or extreme event scenarios;
>
> (b) floods with a medium probability (likely return period ≥ 100 years);

[1666] *Ibid.*

[1667] See sections 1.5 and 1.6 above.

[1668] Article 5 of the 2007 Flood Management Directives provides " (1) On the basis of a preliminary flood risk assessment as referred to in Article 4, Member States shall, for each river basin district, or unit of management referred to in Article 3(2)(b), or portion of an international river basin district lying within their territory, identify those areas for which they conclude that potential significant flood risks exist or might be considered likely to occur. (2). The identification under paragraph 1 of areas belonging to an international river basin district, or to a unit of management referred to in Article 3(2)(b) shared with another Member State, shall be coordinated between the Member States concerned."

(c) floods with a high probability, where appropriate."[1669]

"Flood hazard maps" and "flood risk maps" are maps that display areas that are likely to be flooded and for which a certain degree of risk is particularly attached.[1670] These areas have different degrees of exposure to flood; there are those with low, medium, and high probability to be flooded.[1671] The 2007 EU Flood Directives require that basin States may prepare these flood hazard and flood risk maps, focussing first on areas where a potential risk of floods to occur exists. In the above scale, these areas could be the ones with a high probability of being flooded. Nevertheless, the 2007 Flood Directive maintains such an obligation even if the risk to flood has only a "low probability" of occurring.[1672]

Flood hazard and flood risk maps are to be made available to the public, according to Article 14 of the EU Flood Directive.[1673] Flood hazard maps must contain a range of hydrological information that can help foresee and understand the potential of the flood in every place that has a significant likelihood of floods.[1674] In a considered area, the level of the details to be included in the maps comprises mapping and listing of the potential adverse consequences that are associated with floods.

The necessity to prepare flood hazard maps and flood risk maps will grow higher in the Congo River basin, especially as time goes by. Given the usually limited capacity of the governments across the basin to fund emergencies, it should be profitable for the states of the basin to give importance to undertaking preventive actions long enough before floodings began. If floodings begin, damages will not only cause significant losses but also further reduce states capability of intervention.

The European Union has recognised this state of affairs; that is why it has developed a comprehensive flood management instrument. The organisation has instituted not only the Flood Risk Assessment and Management stages but has also created an institution, the Central European Flood Risk Assessment and Management, to be in charge

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[1669] Articles 6 (1), 6 (2), 6 (3) of the 2007 Flood Management Directives.

[1670] Article 11 of the 1992 UNECE Watercourses Convention.

[1671] Articles 6 (3) of the 2007 Flood Management Directives.

[1672] *Ibid*. Article 6.3.(a).

[1673] *Ibid*. Article 14.

[1674] *Ibid*. Article 6.4.

of flood risk assessment and management.[1675] If customised to the context of the Congo River basin, such initiative may prove to be helpful and resource-saving for the states of the basin in general, and for the states of the transboundary river basins worldwide, where are found flood prone-areas in particular.

9.3.3.3 The obligation to establish flood risk management plans

Article 7.1 of the Flood directive enjoins member states to establish flood risk management plans that will be coordinated at river basin district, meaning at a smaller scale than at river basin. Such an obligation does not exist in the CICOS regime. Articles 7 provides:

> "Based on the Hazard Maps and flood risk maps (referred to in Article 6), Member States shall establish flood risk management plans which are coordinated at the level of the river basin district or unit of management..."[1676]

In the flood management regime that applies to the Rhine River basin, the obligation to establish flood risk management plans follows the obligation to undertake "preliminary flood risk assessments".

The establishment of flood risk management plans will require, in particular, working basin-wide cooperation. Such cooperation does not necessarily need to be formal pre-existing water cooperation, which as we know in the case of the Congo River basin, is not yet in effect. The existence of basin states-general cooperation can as well be a starting point for discussing flood management issues at the river basin or sub-basin level.

As argues Gilissen,[1677] two things are needed, especially in a transboundary context in order to reduce society's vulnerability to floods: cooperation and innovation. One of the outstanding examples of transboundary flood management that was reached thanks to existing cooperation schemes can be drawn from the 1961 Columbia River Treaty

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[1675] The Central European Flood Risk Assessment and Management *https://www.keep.eu/project/5475/central-european-flood-risk-assessment-and-management-in-centrope* , accessed on 12 August 2019.

[1676] Articles 7 and 8 of the EU 2007 Flood Management Directives.

[1677] H.K. Gilissen *et al.* Bridges over troubled waters: an interdisciplinary framework for evaluating the interconnectedness within fragmented flood risk management systems' (2016) 1 (25) *J of Wat L* 12, 26.

between the United States and Canada.[1678] In 1948, an overnight flood destroyed the town of Vanport, Oregon, USA.[1679] Over eighteen thousand people were left with no homes.[1680] The extent of the material damage from the flood became a stimulus for the negotiation of a treaty on the Columbia River that would be signed in 1961.

The flood risk assessment conducted through the Columbia River region, followed by the subsequent flood management plan, showed that from a geographical viewpoint, the best locations to build dams that would have sufficient storage capacities to prevent future floods in the town of Vanport were located on the Canadian territory.[1681] However, Canada lacked a reason for engaging in these dams construction; the dams were necessary for the USA. The Columbia River Treaty came and solved the issue. Under the Columbia River Treaty, Canada agreed to build three large Dams on the part of the Columbia River in its territory. The country further used the dams for hydroelectricity production.

Flood risk management plans in transboundary contexts will often require further legal enablements that may be needed, whether at transboundary, national, or local levels. In the above case of USA and Canada, the negotiations of the treaty that begun in the 1950s could only be completed a decade later, implying several adjustments in different pieces of laws in order to accommodate the upcoming treaty and make possible its implementation.[1682]

Failing to adopt basin-wide instruments of the calibre of the 2007 EU Flood Directives, the riparian states in the Congo basin should strive to sign bilateral treaties that are aimed at flood management. In river basin contexts, reaching bilateral agreements has

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[1678] The Columbia River Treaty was negotiated between the United States and Canada since the 1950s. Adopted in 1906, the treaty entered into force in 1964. See for more details Brady *et al.* (note 511 above).

[1679] R.W. Sandford *et al. The Columbia River Treaty: A Primer*. (2014), 10-11.

[1680] *Ibid*.

[1681] The lack of interest of Canada in the project was based on the cost of the storage projects, the costs of the inundated lands, and the cost of dislocation between lands, land uses and communities, that would be on the Canadian side. Whereas almost all of the benefits, which it was possible to plan for would occur in the US. See *Ibid*. Sandford at 194.

[1682] *Ibid*. Sandford at 10-11.

proven to be easier than negotiating the basin-wide ones. Bilateral agreements are "lighter" to negotiate, reach and manage than the multilateral ones.[1683]

The following point may relate to public participation in the planning of flood management. Article 10(2) of the 2007 EU Flood Directive Management creates an obligation for the active involvement of the public in the flood management regime.

> "The Member States shall encourage the active involvement of interested parties in the production, review, and updating of the flood risk management plans referred to in Chapter IV."[1684]

The regime that is applicable to the Rhine River basin attaches great importance to public participation, as a matter of a stronger regime. It is also owing to such importance that the EU 2000 Water Framework Directive introduced earlier the concept of river basin districts, which was just mentioned. In the Rhine River regime, river basin districts are the central units for flood management.[1685] The idea behind the establishment of river basin districts was to decentralise the management of floods by bringing it as close as possible to the constituencies and the people that live in areas where the floods are more likely to occur.[1686]

The regime that is applicable to the Congo River, which does not have such provision, may find such decentralisation inspiring because it strengthens the participation of the public, especially the ones that are directly affected by the floods, and better mobilises local resources whether legal, institutional or financial, which may be available for flood management. However, such decentralisation may also turn out to be disastrous because of the lack of adequate resources across the region.

In many countries, projects that depend on the lower spheres of governance may suffer lack of fundings and attention because of the lack of adequate resources, in comparison to projects that depend on the higher spheres of governance such as the national, or in some cases the provincial levels. Porto-Sancho[1687] stressed on the crucial character of the implication of lower spheres of state governance, such as municipalities,

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[1683] For more details on states practice of transboundary water treaties, see section 3.3 above.

[1684] Article 10(2) of the 2007 EU Flood Management Directives.

[1685] See Articles 2.15 and 3.1 of the EU Directive 2000/60/EC.

[1686] *Ibid*.

[1687] Porta-Sancho *et al.* (note 1489 above; 67).

villages, and other basic communities to the management of the floods that may strike their lands. For that author, formal strategies and cooperation are often decided by higher spheres of governance, whereas their implementation takes place at local levels. The necessity to ensure the participation of the local spheres of governance, as early as possible, in the planning stages of flood management is therefore required.

Early involvement may be decisive for the future stages of flood management at community levels and for local governing bodies after these ones have appropriated the objectives of such programmes.[1688] Also, skills for flood prevention and management will often be innovative for most of the local governing bodies and communities, because in most of the cases they perhaps have never been exposed to significant floods in the past, and because of that, their early involvement in flood management programmes would contribute to their appropriation of its process.[1689]

9.3.3.4 The obligation to exchange information, and to consult the other riparian states

Article 9 of the 2007 EU Flood Management Directives lays an obligation on the EU member states to work in coordination for the application of the Directive and to exchange information that contributes to the application of the Directive. Such a specific obligation for flood management does not exist in the CICOS regime. As said earlier, there exists in the CICOS regime a general obligation for information sharing, which is not to be compared with the flood-centred obligations that are contained in Article 9 of the 2007 EU Flood Management Directives. This provision stipulates that

> "Member States shall take appropriate steps to coordinate the application of this Directive and that of Directive 2000/60/EC focusing on opportunities for improving efficiency, information exchange and for achieving common synergies

[1688] On community involvement regarding floods management, see generally D. Benson *et al.* 'Evaluating social learning in England flood risk management: an 'individual-community interaction'perspective. (2016) 55 *Env Sc & Pol* 326; N. Jukrkorn *et al.* 'Community-based flood risk management: lessons learned from the 2011 flood in central Thailand' (2014) 184 *WIT Trans on Eco & the Env* 75; E. Bell & G. Blashki 'A method for assessing community flood management knowledge for vulnerable groups: Australia's 2010–2011 floods' (2013) 1 (49) *Com Dev J* 85.

[1689] *Ibid*. Benson *et al.*; *Ibid*. Jukrkorn *et al.; Ibid*. Bell & Blashki.

> and benefits having regard to the environmental objectives laid down in Article 4 of Directive 2000/60/EC."[1690]

The above provision of the Rhine River regime obliges the member states to exchange information and conduct adequate consultations with other member states for projects that may represent significant risks for floods.

There exists a general provision in the CICOS regime under Article 4 of the 2007 CICOS Additive Treaty, which also enjoins member states to consult and share information. However, the content of the information to be exchanged under the Rhine flood regime is different and even more flood specific, compared to the information that is referred to in Article 4 of the 2007 CICOS Additive Treaty, which is rather general. There is, therefore, not many similarities between the two provisions of the two regimes. The information to be exchanged under the Rhine regime refers in particular to the first stages of flood management, namely the information regarding the flood risk assessment, the flood hazard maps and the flood risk maps, including their subsequent reviews". Paragraph 16 of the preamble of the 2007 EU Flood Management Directive provides:

> "To prevent duplication of work, Member States should be entitled to use existing preliminary flood risk assessments, flood hazard and risk maps, and flood risk management plans for the purposes of achieving the objectives and satisfying the requirements of this Directive."

Moreover, Article 4 (3) adds:

> "3. In the case of international river basin districts, or units of management referred to in Article 3(2)(b) which are shared with the other Member States, Member States shall ensure that exchange of relevant information takes place between the competent authorities concerned."

Even the "preparation of flood hazard maps and flood risk maps"[1691] on a tributary to a transboundary watercourse is subjected to exchange of information first, between the basin's State members that are concerned by the flood hazard or risk. As claimed by

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[1690] Art. 9 of the 2007 Flood Management Directives.

[1691] *Ibid*. Article 6 (2).

Folke[1692] and Cosens,[1693] effective adaptive governance depends not only on successful coordination of multilevel decision-making entities but also on active information exchange between institutions. The competent authorities that are concerned are enjoined to exchange information on flood issues for optimal flood management.

From a transboundary perspective, riparian countries are put under obligation to exchange any critical information not only between the spheres of governance of the affected countries but also with different national and supranational authorities, including river basin organisations. The authorities that are considered in the information-sharing obligation above are the authorities whose mandates include flood risk concerns.[1694] For Beijing,[1695] the regime that is applicable to the Rhine basin calls for the collection of updated information on floods in order to support the decision making-process for flood management.

The problem of information sharing in general and in the Congo River basin, in particular, is all the more crucial. It is indeed advisable and even compulsory, to some extent, to ensure the involvement of third parties in the process of flood management. However, recognising a right to communities is one thing, and ensure that they exercise such right is another. A recent study that was undertaken by Kaufmann[1696] targetting the participation of the European public in flood management issues revealed mixed results. The researcher noticed a general lack of interest in flood management issues among the citizens, mainly because they were little aware of flood issues. [1697] In countries such as

[1692] C. Folke et al. 'Adaptive governance of social-ecological systems' (2005) 30 *An Rev of Env & Res* 441-442.

[1693] B. Cosens 'Transboundary river governance in the face of uncertainty: resilience theory and the Columbia River Treaty (2010) 30 (2) *Jof Lan, Res & Env L* 229, 265.

[1694] Article 4 (3) of the 2007 Flood Management Directives.

[1695] B.A. Beijen *et al.* 'The importance of monitoring for the effectiveness of environmental directives: a comparison of monitoring obligations in European environmental directives' (2014) 10 (2) *Utr L Rev* 126, 135.

[1696] See details in M. Kaufmann *et al. Analysing and evaluating flood risk governance in the Netherlands: drowning in safety?* (2016), available at *http://www.starflood.eu/documents/2016/03/wp3-nl-final-webversion.pdf* , accessed on 15 August 2019.

[1697] *Ibid*. Kaufmann at 24-25.

England and Sweden, Kaufmann[1698] collected complaints claiming that the public comments were not being taken into consideration.

All the above can constitute sound references to the CICOS regime, which may use some of these available good practices in order to design better information-sharing programs that take into account, to the possible extent, all the relevant flood-related factors.

9.3.3.5 Review mechanisms

Article 14 of the 2007 Flood Management Directives provides for the review mechanism, which the Rhine flood regime has made possible for the member states. The CICOS regime does not have any similar mechanism, which is focused on floods; instead, it is comprised of a review mechanism of general scope. Article 14 of the 2007 Flood Management Directives provides as follows:

> "1. the preliminary flood risk assessment, or the assessment and decisions… shall be reviewed, and if necessary updated, by 22 December 2018 and every six years thereafter.
> 2. The flood hazard maps and the flood risk maps shall be reviewed, and if necessary updated, by 22 December 2019 and every six years thereafter.
> 3. The flood risk management plan(s) shall be reviewed, and if necessary updated… by 22 December 2021 and every six years thereafter.
> 4. The likely impact of climate change on the occurrence of floods shall be taken into account in the reviews referred to in paragraphs 1 and 3." [1699]

A quick analysis of the review mechanism of the flood regime of the Rhine under Article 14 above reveals that this provision concerns as well the periodic review of the substantial obligations that are created by the regime of the 2007 Flood Management Directive.

Under the Rhine regime, both the preliminary flood risk assessment, the flood hazard maps, the flood risk maps, and the flood risk management plan are all subject to periodic reviews and updates if necessary. There is first an initial mandatory review or

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[1698] *Ibid.* ; Article 9 (2) and 9 (3) of the 2007 Flood Management Directives explicitly requires coordination of public consultation. The motivation behind such coordination is to prevent multiple and unrelated procedures for public participation that would run in parallel.

[1699] *Ibid.* Article 14.

update, after which, as showed in Article 14 above, a timeframe of six years is given, at the end of which there must be a process of review, or if necessary, the update of all the obligations that are referred to in Article 14.

Although such a periodic review mechanism may represent weighty additional costs for member states, there is a particular incentive in keeping the information that is related to floods updated. This should particularly be the case as analysis continues to downscale the impacts of climate change from regional levels to more localised contexts. Efforts are also being undertaken to further understand climate change impact on natural resources, including on freshwaters at the transboundary level. Previsions of impacts may evolve as the level of comprehension about the phenomenon evolves. On the other side, as states evolve, both socially, economically and legally, the context that once prevailed and that made certain areas of the state to be tagged as flood-vulnerable may improve after a certain period.

9.3.4 Concluding thoughts on the comparative analysis between the two regimes

It is now evident that the flood management regime that is in place in the Rhine River basin is far advanced than the CICOS regime. To better prepare the Congo River basin for flood management, the basin needs an adequate flood management regime. The features of the Rhine River regime that have been analysed seem to be more adequate. However, the establishment of a robust flood management regime such as the Rhine's implies a considerable investment of resources, types of equipment, studies and surveys, as discussed above.[1700] It also requires working cooperation between the states of the basin.[1701] At this stage, many factors that will need attention for a flood management regime across the Congo River basin have come to our attention. These include, but are not limited to, the technical and financial capabilities of the states of the basin that are required to institute and implement such an adequate flood management regime.

If the European Union has been particularly active in dealing with floods, it was certainly not because of its robust 2007 Flood Management Directives alone. There was a combination of factors, including the availability of human, material and financial resources to support all the required stages for successful flood management. The economic

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[1700] UNECE (note 1663 above; 15).

[1701] See Article 4.2 of the 2007 Flood Management Directives.

precarity of the riparians countries of the Congo River and the immensity of the geographical challenges that are awaiting them may hamper the development and successful implementation of strong flood management programs.

Compared to the size of the Rhine River basin (which is 185,260 square kilometres), the size of the Congo River basin (which is 3.8 million square kilometres) may, in itself be viewed as a first challenge.[1702] Also, the significantly disparate GDPs of the two basins, the estimation of the GDP of the states of the Rhine basin is around 4,101,629,22 million US Dollars, whereas the estimation of the GDP of all the states of the Congo River basin is around some 318,885,56 million US Dollars, are a challenge.[1703]

The ratio of proportions being approximately 1/20 for the basins' sizes and 1/13 for the basins' GDPs, it means that for a surface that is approximately twenty times smaller than the Congo River basin, the Rhine River has thirteen times financial resources to develop its flood management programs. Besides a relatively bigger size combined with a smaller GDP, the Congo River basin has poor infrastructures development, which may also contribute to unsuccessful flood management programs.[1704] This is of concern in particular because some areas that may be useful in terms of flood management may not be easily accessible due to the basin's poor infrastructures, and because of that be hardly included in flood plannings. Even though there are some modern technics as for example the remote sensing that may assist to bypass the difficulties that are associated with limited accessibility across a given geographical region, physical contacts will remain compulsory for flood risk assessment and management.[1705]

[1702] See sections 8.3.1 and 8.3.3 above.

[1703] On details concerning the GDP of the Rhine and Danube River basin states, see annexes 4 and 5 below. On the GDP of the Congo River basin states, see:
https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?view=chart , accessed on 20 July 2019.

[1704] See section 5.2 above for a detailled physical description of the Congo River basin.

[1705] Physical contacts with designated areas may be crucial in projects involving for instance soil texture, structure and composition analysis, impact studies, which so far can not be completely achieved through tele detection or drone technics alone. On the use of remote sensing technics in flood management see generally M. Kabenge *et al.* 'Characterizing flood hazard risk in data-scarce areas, using a remote sensing and GIS-based flood hazard index' (2017) 3 (89) *Nat haz* 1369; F. Franci *et al.* 'Satellite remote sensing and GIS-based multi-criteria analysis for flood hazard mapping' (2016) 83 (1) *Nat Haz* 31-51.

The current climate change regime has notably advocated for a transfer of technology from developed countries to the developing ones, in order to support the efforts of these in climate change mitigation and adaptation.[1706] Perhaps, the experience that has been accumulated by the Rhine basin states in terms of flood management and that makes it more advanced in that field may be transferred to the states of the Congo River through climate change cooperation. If such a thing occurs, it may contribute to accelerating the design of flood management programmes, as extensively outlined above.

9.4 Conclusion

This chapter has assessed the extent to which the legal framework that governs the Congo River and its transboundary tributaries (which is the CICOS regime), has integrated the climate change dimension. It has first applied Cooley & Gleick's criteria framework on the CICOS regime, after what it has also undertaken a comparative analysis between the flood management provisions under the CICOS regime and the flood management regime that governs the Rhine River basin. The key findings of this chapter are as follows: firstly, the CICOS regime is inadequately equipped with responsive mechanisms to the impacts of climate change on the waters of the Congo River and its transboundary tributaries, even if in nominal terms the regime has claimed to have taken the climate change phenomenon into consideration. Secondly, the CICOS regime is deprived of any flexible strategy for water allocation and has not sufficiently developed water quality standards for the member states. Also, despite climate change predictions on the Congo River basin concerning a high likelihood of flood to be occurring sooner, the Congo River and its transboundary tributaries are deprived of appropriate strategies in response to the looming floodings. Instead of adequate flood management provisions, the CICOS regime has only made a mere reference to the likelihood of floods. At last, findings are that the joint mechanism instituted by the CICOS regime has only a partial membership from the countries of the Congo River basin.

The comparative analysis has shown only a few similarities between the CICOS regime and the Rhine River regime, but then significant differences. Both regimes are responsive to Article 27 of the 1997 United Nations Convention on the Non-

[1706] See Articles 6.8, 10.1, 10.2, 10.4, 10.6, 13.9, 13.10 of the Paris Agreement of 2015; See Also Article 4.1 (c), 4.3, 4.5, 4.7, 4.8, 4.9 of the 1992 UNFCCC.

navigational uses of International watercourses, which enjoins riparian states to avoid taking actions that may result in floodings or any other harmful conditions to the other riparian states. However, the two regimes have shown significant disparities because, in the Rhine River basin, floods are governed by a flood-specific instrument, which is the 2007 EU Flood Management Directive, while in the CICOS regime, floods are merely mentioned in a general treaty provision, and have not been specifically addressed. Also, the Danube-Main-Rhine water transfer has revealed the possibility of harvesting the surplus of rainfall waters in flood-prone areas, as a measure of flood management, and the transferring of such waters to drought-prone areas, outside a given river basin, which case may inspire a flood management regime across the Congo River basin.

10 CONCLUSION AND RECOMMENDATIONS

10.1 Overview of this thesis

This thesis is an attempt to investigate the extent to which the legal framework that governs the Congo River and its transboundary tributaries have integrated the climate change dimension. Projections from several climate change models predict that there will be a general increase in the Congo River's discharge in the order of 11-17 percent by the year 2050 and an increase in the basin's run-offs in the order of 18 to 27 percent by the end of the current century.[1707] Such predictions regarding the Congo River basin are in significant contrast with the global predictions, according to which approximately seven percent of the world will be exposed to a drop of twenty percent of water availability as a result of every additional degree Celsius to the global temperature.[1708] Excessive water and precipitations across the basin will result in floodings in the flood-prone areas of the Congo River basin, for which the legal regime that governs the Congo River and its transboundary tributaries has to be adjusted.

River basins and riparian countries have to adjust their water-sharing legal frameworks to climate change, based on the predicted impact of climate change in their contexts. The IPCC and several other institutions and scholars have helped generate climate change predictions for the water resources of every region on the globe.[1709] It is evident from these predictions that the impact of climate change on water resources will not be evenly distributed across the globe. There are regions where there will be lesser waters and regions where there will be excessive waters. From this thesis findings, it appears that the Congo River basin will be among the river basins that will experience excessive waters and frequent episodes of intense floodings, especially during the rainy seasons.[1710] The legal framework that governs the waters of the Congo River basin has, therefore, to be adjusted to cater for such predicted climate change impacts to enable basin-wide and sub-basin flood

[1707] See section 5.6.1 above.

[1708] See section 1.1. above concerning the global predictions.

[1709] *Ibid*.

[1710] See section 5.6.1 above.

management readiness. The Congo River basin is comprised of sub-river basins of which some are domestic and others transboundary.

Ten riparian countries of the Congo watercourse contribute to the waters of the Congo River, among which four are regarded as the major contributors and leading riparian countries of the Congo watercourse. These leading riparian countries include the Central African Republic, the Republic of the Congo, the Republic of Angola, and the DR-Congo. Improvement of the responsiveness of the laws that govern the transboundary water resources of the Congo River basin to climate change will require a certain number of actions among which are: *firstly*, the involvement of the basin's riparian states, whether in bilateral or in basin-wide treaties; *secondly*, the establishment of basin-wide, or sub-basin-wide water cooperation, or the establishment of both; *thirdly*, the adjustment of the basin's legal framework to make more prepared to deal with the predicted impacts of climate change on the shared water resources.

All the above developments explain the reason why the investigations accounting for this thesis revolved around the central question: "How far has the legal framework that governs the Congo River and its transboundary tributaries taken into account the climate change phenomenon and its impact on water resources in the Congo River basin?" In fact, it is not enough for a treaty, a convention, or any other legal document to merely mention "climate change" or to make reference to any factor relating to climate change in its provisions for such a regime to be regarded as having incorporated the climate change dimension.

In addition to the central question of this thesis, two additional sub-questions have significantly contributed to the steps taken through this thesis, which steps have culminated in the assessment of the regime that governs the waters of the Congo River and its transboundary tributaries in the chapter preceding this conclusion. The first question was an enquiry to know whether "climate change considerations have been adequately integrated in the existing agreements on the waters of the Congo River and its transboundary tributaries," and the second question sought to investigate the extent to which "the legal framework that governs the waters of the Congo River and its transboundary tributaries has dealt with the predicted impacts of climate change on the waters of the Congo River basin."

After discussing some key concepts of the study, this thesis has analysed the historical evolution of the international law of transboundary water resources before

discussing its current stage. The descriptions of the hydrography of the Congo watercourse and the Congo River were done before the analysis of the legal framework that governs the waters of the Congo River and its transboundary tributaries. It is in this view that this thesis inventoried the two agreements that apply to the Congo River and its transboundary tributaries, namely the agreement that establishes a uniform regime of navigation on the Congo, Ubangi and Sangha Rivers, and which creates the International Commission of the Congo-Oubangui-Sangha Basin of 1999, and its Additive Treaty of 2007, which this thesis referred to as the "CICOS regime".

The assessment of the integration of climate change in the CICOS regime was based on Cooley & Gleick's framework of evaluation which was discussed in chapter 7, whereas the assessment of the extent to which the CICOS regime deals with the predicted impacts of climate change on the waters of basin was done through a comparative analysis with the flood management regime that is in place in the Rhine River basin.

Cooley & Gleick's fourfold framework criteria for the evaluation of the integration of climate change considerations in transboundary water treaties checks:

i. *the existence of flexible mechanisms for water sharing and water quality standards;*
ii. *the existence of treaty provisions for extreme events;*
iii. *the existence of joint mechanisms in support of joint actions on the shared waters;*
iv. *the existence of in-built mechanisms for treaty review.*

In both steps of the assessments, the analysis of the CICOS regime has involved the applicable Multilateral Agreements for international water resources governance, namely the United Nations Convention on the law of the Non-Navigational Uses of the International Watercourses of 1997. The analysis has also included wherever available any basin-wide water treaty, the European Union Water Directives of 2000 and The EU Flood Directivess of 2007. The main conclusions regarding the assessments this thesis has undertaken are, therefore, as follows:

10.2 Summary of the findings

10.2.1 Concerning the integration of climate change in the existing agreements on the waters of the Congo River and its transboundary tributaries

From the analysis undertaken in this thesis, it transpires that:

1. The CICOS regime does not have any flexible strategy required for the allocation of the shared water resources among its member states. The research has revealed that in water-rich contexts, such as the Congo River basin, water allocation between the riparian states is not generally a priority because the volume of water that is available is often far above the volume of water that is needed by the basin's water users. However, it appears that, under Article 9 of the 2007 CICOS Additive Treaty, the countries of the Congo River basin might adopt, in future, water allocation mechanisms between them or between the basin's water users. Under Article 9 of the 2007 CICOS Additive Treaty, member states are enjoined to decide on which water demands are of priority among the diverse water demands, based on a proposal to be issued by the CICOS in the future. Such a proposal may, in all likelihood be the entry point for water allocation mechanism across the CICOS region. Concerning water quality standards, the research has revealed that the regime mentions water quality but fails to provide for any standard of it. Furthermore, the CICOS regime has adopted a bottom-up approach, remitting to state members the responsibility to jointly adopt water quality standards that are to be implemented in the geographic area which is covered by the commission.

2. This thesis has secondly revealed that the regime that governs the waters of the Congo River is not equipped with any strategy for response to extreme events such as floods. Article 7 of the 2007 CICOS Additive Treaty is the only provision of the regime that mentions extreme events, yet, it does so only from one perspective, meaning the definition of water use modalities in the event of floods and droughts.

3. This thesis has thirdly revealed that there was a "built-in" review mechanism in Article 22 of the 2007 CICOS Additive Treaty, which provides for smoother treaty amendments or reviews, hence making the CICOS regime meet Cooley & Gleick's third criterion, which relates to the inclusion in the treaty provisions some mechanisms of treaty flexibility.

4. Lastly, this thesis has shown that the CICOS regime was equipped with a joint mechanism, which aims at promoting interstate water cooperation. The regime's joint mechanism ensures that the basin's water resources are unilaterally managed only up to a certain point, beyond which there is a necessity to consult the other parties for joint management. However, the regime has failed to provide for the establishment of sub-river basin institutions, which could enhance water management and cooperation, because of the size of the basin and its crucial importance to the continent and to the world.

Table 15 here below summarises the main findings which are explained above, concerning the application to the CICOS regime of Cooley & Gleick's fourfold criteria framework.

Table 15: Summary of the results from the assessment of the responsiveness of the Congo River's regime to climate change, using Cooley & Gleick's Framework Criteria

Criteria	Existence in the CICOS regime
Mechanisms for flexible water allocation	Do not exist
Extreme events provisions	Do not exist
Review mechanism	Exists, but only partially
Joint Institutions	Exists, but with no sub-institutions

Source: Thesis own compilation.

The above analysis was developed in detail in chapter 9. It was aimed at the assessment of the responsiveness of the CICOS regime to climate change against Cooley & Gleick's framework of criteria and was an attempt to respond to the first sub-question of this thesis, which is mentioned above. The assessment that was undertaken in chapter 9 and which has been summarised above have shown that the regime that governs the waters of the Congo River and its transboundary tributaries has not adequately integrated the climate change dimension. The analysis indicates that further efforts will be needed to achieve such integration of the climate change dimension.

10.2.2 Concerning the extent to which the existing agreements that govern the waters of the Congo River and its transboundary tributaries has dealt with the predicted impacts of climate change on the hydrology of the basin

In response to the second sub-question of this thesis, the research has, in chapter 9, considered undertaking a regime comparison regarding flood management. The chosen river basin for regime comparison was the Rhine River basin. Two reasons have motivated the choice of the regime that applies to the Rhine River basin. First, this Rhine River basin has a robust flood management regime, which is the regime adopted by the European Union for its state members. Second, the predictions that are made concerning the impact of

climate change across the Rhine River basin are comparable to the predictions that are made on the Congo River basin. Both River basins will experience seasonal floods because of climate change.

However, being that the regime that is governing the Congo River and its transboundary tributaries failed to have any existing flood management instrument or provision, there was nothing significant that could be referred to on the Congo River's side for a regime comparison. Therefore, the regime comparison undertaken turned to an effort to describe the core features of the Rhine regime with the view of providing for a referential legal framework for flood management for the Congo River.

The core features of the Rhine's flood management regime revolve around the following five obligations:

i. the obligation to conduct a preliminary flood risk assessment;
ii. the obligation to prepare flood hazard maps and flood risk maps;
iii. the obligation to draft flood risk management plans;
iv. the obligation to exchange information and to consult;
v. the obligation to review mechanisms relating to flood management.

The riparian states of the Rhine basin are obliged to undertake a preliminary flood risk assessment in each river basin district of a transboundary river basin lying within their territory.[1711] These preliminary flood risk assessments are to be based on "available or readily derivable information, such as records and studies on long term developments, in particular impacts of climate change on the occurrence of floods". [1712] A preliminary flood risk assessment "shall be undertaken to provide an assessment of potential risks".[1713] The available studies predicting the occurrence of floods as impacts of climate change on the Congo River basin are sufficient motivations for the undertaking of preliminary flood risk assessment across the region.

Riparian states of the Rhine River are further obliged to prepare flood hazard maps and flood risk maps that aim at providing the cartographies of risks that are associated

[1711] Article 4 of the 2007 EU Flood Management Directives.

[1712] *Ibid.*

[1713] *Ibid.*

with floods across the basin. Based on the preliminary flood risk assessment, the flood hazard and flood risk maps, the riparian states are to establish flood risk management plans that will be coordinated at a smaller scale than at a river basin (like for instance at the scale of the river basin district).[1714] The 2007 EU Flood Management Directives has further laid an obligation on the states to work in coordination for information exchange, especially the information that contributes to the implementation of the 2007 EU Flood Management Directive. Lastly, the Rhine flood management regime has provided a review mechanism strategy for its country parties.

The fact that the Rhine River's regime has erected into obligation all the above steps to contribute to flood management at local and river basin levels offers a reliable reference to the regime that is in place in the Congo River basin, which has not yet developed any specific step in the sense of putting in place such a flood management system which is to be directed at controlling the adverse effects of climate change through floodings.

The thesis has further analysed the arrangements of the Danube-Main-Rhine water transfer scheme that aimed at collecting the surplus of rainfall and snowmelt waters from the Danube River basin south of Germany to supply water to a drying part of the Rhine River basin which is north of Germany. The Danube-Main-Rhine water transfer scheme is particularly interesting as it exemplifies the possibility of combining flood control measures with water transfer activities. It reveals that flood control measures can be implemented with the view of collecting the excessive waters from a basin's flood-prone areas in order to transfer them towards the water-stressed region elsewhere, apart from protecting these flood-prone regions from floodings.

The Danube-Main-Rhine water transfer scheme, however, has not yielded ample results from a transboundary water law perspective, because it was a German domestic project. Nevertheless, the solicitation of interbasin water transfer that is placed on the waters of the Congo River, as discussed in section 5.5.2 above can be inspired from the Danube-Main-Rhine scheme, because it shows the possibility of establishing a connection between flood control infrastructures and water transfer.

[1714] See section 9.3.3.1 above.

The States of the Congo River basin that does not have any water-sharing agreement in place will most probably be confronted soon with issues regarding water allocation or water entitlement between them due to the possibility of water transfers as explained above. Ashton[1715] already attracted attention when he claimed that in Africa, water disputes were often related to accusations that shared water resources, or the benefits from projects such as water transfers were not shared across the basin.[1716] This author's findings also suggested the possibility of avoiding water conflicts by putting in place water agreements, which define beforehand the sharing processes of both the water resources and the benefits thereof.[1717]

Defining water allocation among the countries of the Congo River and defining the allocation of the benefits that are generated from the shared water resources will much probably be one of the next critical steps around the waters of the Congo River ad its transboundary tributaries. Such prediction is based on careful consideration of the hydropolitics of the different states of the Congo River basin, and the incidence of such hydropolitics of the waters of the basin, as explained in this thesis.[1718] It is for instance necessary to define water entitlements for all the riparian countries of the Congo River before undertaking any water transfer, in order to avoid water disputes between the states of the basin. That is why the approach that was adopted for water treaties in the Euphrates and Tigris River basins can inspire the negotiation of bilateral water treaties between the riparian countries of the Congo watercourse.

10.3 Summary of Contributions

The main contributions that are brought by this thesis are the following: *Firstly*, no previous study has investigated the climate change responsiveness of the regime that governs the Congo River and its transboundary tributaries, with an emphasis on floods, which, according to the climatic predictions will represent the main impact of climate change on the hydrology of the basin. By discussing the legal implications of such impacts, this thesis has provided a

[1715] Ashton (note 44 above; 4).

[1716] *Ibid.*

[1717] Citer sharing water, sharing benefits and responsibilities.

[1718] See section 6.4 above.

timely opportunity to advance understanding of the extent of the impact of climate change across the Congo River basin.

Through comparative analysis with the flood management regime that is in place in the Rhine River basin, this thesis has shown the inadequacy of the regime that governs the Congo River and its transboundary tributaries regarding flood management. This thesis has also shown that climate change is inadequately taken into consideration by the Congo River's regime and that further efforts were needed to correct such inadequacy.

Secondly, this thesis has shown the need and the urgency required to establish an adequate preventive flood management regime to be applied in the whole of the Congo River basin, but more particularly on the flood-prone regions that may be localised through flood risk assessments that have to be conducted across the basin. The adoption of climate-proofed water treaties that include flood management mechanisms will have several interests, including, *firstly*, the fact that these treaties will prevent rather than fix issues associated with floods, even at transboundary levels. S*econdly*, the adequate flood management plans that are to be established by such treaties may contribute to harvesting significant amounts of the extra waters from flooded areas, that will thereafter be transferred or exported to some of the drought-prone regions around the Congo River basin.

Thirdly, this thesis has contributed in clarifying the legal status of the Congo River, which is an international river, from the fact that a considerable section of the Congo River forms the boundary between the DR-Congo and the Republic of the Congo, and also from the fact that the Congo River is the main outlet of the whole Congo River basin which receives one-third of its waters from riparian countries other than the DR-Congo.[1719] Such complex hydrographical configuration of the Congo River, which has for long fuelled confusions around its international or domestic status has been addressed under the 1997 UNWCC, which meanwhile enjoins riparian states to negotiate transboundary water treaties that are adapted to the hydrographical particularities of each international river basin and watercourse.

The Congo River starts within the territorial delineations of the DR-Congo and does not cross over any of this country's political boundaries, until its discharge into

[1719] Discussed in section 5.3 above.

the Atlantic Ocean, straight from within the DR-Congo, which is, as said, its country of birth.[1720] One of the intricate features of the Congo River is that some sections may be approached as international, whereas others are to be approached as domestic. In this sense, the domestic portion of the Congo River is to be regarded as a domestic tributary that discharges in the portion of the Congo River that can be approached as international.

However, a special regime needs to be negotiated between the riparian states of the Congo River and adopted for the section of the Congo River that is to be approached as an international river.[1721] This is because all the sections of the Congo River, whether international or domestic, run exclusively within the territory of a single country, the DR-Congo, apart from some sections of the Congo River that contribute to forming the boundaries between this country and the Republic of the Congo, and the Republic of Angola.[1722] It is hoped that the growing debates and cooperation around the water resources of the Congo River basin that has begun will help to materialise this.

10.4 Recommendations and further research

After months of research, analysis and drafting concerning a climate-proofed legal regime to govern the waters of the Congo River and its transboundary tributaries, it is humbling to formulate the following recommendations:

1. The establishment of water cooperation along the Congo watercourse and the adoption of bilateral climate-proofed water treaties between the DR-Congo and the other riparian states of the Congo watercourse, which are the Republic of the Congo, the Republic of Angola, and the Central African Republic. The aim of such bilateral water treaties will be to recognize and to clarify any issue concomitant to the natural connection that exists between the Congo River and its transboundary tributaries, including the internationality of the Congo River. It is because of the particularities of the hydrography

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[1720] This claim is true in the condition that the source of the Congo River remains within the DR-Congo territory. But, if the source is the Chambeshi River, in Zambia, then the claim would no longer hold. See Section 5.3 above for further details. For an illustration, see Map 6 below, in Annexe 6 below: the Congo River, born and dischaging from within the territory of the DR-Congo.

[1721] See sections 5.3 and 5.5 above.

[1722] *Ibid.*

of the Congo watercourse that this thesis recommends such a regime of bilateral treaties to govern the waters of the Congo River and its transboundary tributaries. However, these bilateral water treaties may be supplemented at a later stage with multilateral water treaties, if needed. The advantage of adopting bilateral treaties is that these types of treaties allow better interaction and discussions between two states linked by a river.

2. The reinforcement of the mandate of the CICOS as the Congo River basin's joint institution for water management. Such reinforcement of mandate may be obtained through treaty amendment, in order to adequately take into consideration the predicted impacts of climate change on the waters of the Congo River basin. This thesis also recommends that States support to the CICOS may go beyond its current level. A reinforcement and effective CICOS mandate, coupled with stronger support from its member states are determining factors towards the fostering of water cooperation across the Congo River basin and the adoption of bilateral water treaties as recommended above.

3. The clarification of the legal status of the Congo River and the elucidation of the entitlement of its waters among the river's riparian states. From the findings of this thesis, the Congo River has to be approached from a dual perspective, as having both a domestic and an international status, and therefore managed accordingly. This is due to the fact that the Congo River comprises some sections that can be regarded as domestic, and others that can be regarded as international. This recommendation is based on the particular hydrography of the Congo River and its transboundary tributaries, as discussed throughout this thesis. This thesis recommends that such a dual status becomes the basis of a new approach for the governance of the Congo River and its transboundary tributaries. In addition, the establishment of working water cooperation along the Congo watercourse as recommended above will facilitate discussions among the riparian states of the Congo watercourse around some technical and hydrographical issues such as water entitlements, or the sharing of any possible benefits around the waters of the Congo River. The Congo's riparian states may not have the same apprehension and approach regarding these issues, however, it is crucial for them to discuss, negotiate and harmonise their views on them for the future, due to the predicted impacts of climate change on the waters and the communities of the basin.[1723]

[1723] Medinilla (note 951 above; 19).

4. The fourth recommendation of this thesis touches the 1997 United Nations Convention on the Non-Navigational Uses of International Watercourses. Based on the findings of this thesis, further investigations are needed concerning the reason why the 1997 United Nations Convention on the Non-Navigational Uses of International Watercourses has received very little support from states after its adoption. The fact that some of the states that voted towards the adoption of this convention turned around after that and became reluctant to its ratification and its entry into force should be an interpellation to the international water law. In the same order of idea, there is a need for further investigations on states' perceptions concerning the concept of the international watercourse as defined and applied under the 1997 UNWCC. The International Law Commission is encouraged to pursue the efforts associated with the codification of the non-navigational uses of the international watercourses, because of the low support that the regime of the 1997 UNWCC has received from the state members of the United Nation Organisation.

5. The fifth and last recommendation of this thesis calls for further investigations regarding the application of the “Equity” concept for sharing transboundary water resources, as enshrined under Article 5 and 6 of the 1997 UNWCC. These investigations have to bring forth much clarity concerning whether equity in this provision implies that states have rights on a shared watercourse proportionally to the volume of waters that they have contributed in the formation of the total volume of the shared water resource. Furthermore, it seemed unclear from our research how the 1997 UNWCC foresees the intergenerational and the intragenerational dimensions of Equity regarding the sharing of transboundary water resources in a context dominated by climate change impacts on waters; does the concept of equity under Article 5 and 6 of the 1997 UNWCC take into consideration the necessity to ensure water access in quality and quantity to the present and future generations? And how does such a principle turn into law in a transboundary context?

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Annexes

Annexe 1: Category of votes by states during the adoption of the 1997 UNWCC

Sponsors (38)	In Favour (106)	In Favour (-)	In Favour (-)	Abstentions (26)	Absent (31)	Against (3)
Antigua and	Albania	Lao People's Dem Republic	Republic	Andorra	Afghanistan	Burundi
Barbuda	Algeria	Latvia	Thailand	Argentina	Bahamas	China
Bangladesh	Angola	Lesotho	Trinidad and	Azerbaijan	Barbados	Turkey
Bhutan	Antigua &	Liberia	Tobago	Bolivia	Belize	
Brazil	Barbuda	Libyan Arab	Tunisia	Bulgaria	Benin	
Cambodia	Armenia	Jamahiriya	Ukraine	Colombia	Bhutan	
Cameroon	Australia	Liechtenstein	United Arab	Cuba	Cape Verde	
Canada	Austria,	Lithuania	Emirates	Ecuador	Comoros	
Chile	Bahrain	Luxembourg	UK of G B, &	Egypt	Dem People's Rep of Korea	
Denmark	Bangladesh	Madagascar	North Ireland	Ethiopia	Dominican	
Finland	Belarus	Malawi	USA	France	Republic	
Germany	Belgium*	Malaysia	Uruguay	Ghana	El Salvador	
Greece	Botswana	Maldives	Venezuela	Guatemala	Eritrea	
Grenada	Brazil	Malta	Vietnam	India	Guinea	
Honduras	Brunei Dar.	Marshall Isl.	Yemen	Israel	Lebanon	
Hungary	Burkina-F.	Mauritius	Zambia	Mali	Mauritania	
Italy	Cambodia	Mexico	Uruguay	Monaco	Myanmar	
Japan	Cameroon	Micronesia	Venezuela	Mongolia	Niger	
Jordan	Canada	Morocco	Vietnam	Pakistan	Palau	
Lao's PDR	Chile	Mozambique		Panama	St Kitts & Nev	
Latvia	Costa Rica	Namibia		Paraguay	Saint Lucia	
Liechtenstein	Ivory Coast	Nepal		Peru	Saint Vinc. &	
Malaysia	Croatia	Netherlands		Rwanda	the Grenadines	
Mexico	Cyprus	New Zealand		Spain	Senegal	
Nepal	Czech Rep	Nigeria*		Tanzania	Solomon Islds	
Netherlands	Denmark	Norway		Uzbekistan	Sri Lanka	
Norway	Djibouti	Oman			Swaziland	
Portugal	Estonia	Papua New			Tajikistan	
Rep of Korea	Fiji*	Guinea			The former	
Romania	Finland	Philippines			Yugoslav Rep	
Sudan	Gabon	Poland			of Macedonia	
Sweden	Georgia	Portugal			Turkmenistan	
Syrian Arab	Germany	Qatar			Uganda	
Republic	Greece	Rep of Korea			Zaire	
Tunisia	Guyana	Romania			Zimbabwe	
UK of G B. &	Haiti	Russian				
North Ireland	Honduras	Federation				
USA	Hungary	Samoa				
Uruguay	Iceland	San Marino				
Venezuela	Indonesia	Saudi Arabia				
Vietnam	Iran (Islam)	Sierra Leone				
	Ireland	Singapore				
	Italy	Slovakia				
	Jamaica	Slovenia				
	Japan	Sudan				
	Jordan	Suriname				
	Kazakhstan	South Africa				
	Kenya	Sweden				
	Kuwait	Syrian Arab				

Annexe 2: List of States Party to the 1992 UNECE Watercourses Convention

Participant	Signature	Ratification, Accession (a), Acceptance (A), Approval (AA)
Albania	18 Mar 1992	5 Jan 1994
Austria	18 Mar 1992	25 Jul 1996
Azerbaijan	-	3 Aug 2000 a
Belarus	-	29 May 2003 a
Belgium	18 Mar 1992	8 Nov 2000
Bosnia and Herzegovina	-	3 Dec 2009 a
Bulgaria	18 Mar 1992	28 Oct 2003
Chad	-	22 Feb 2018 a
Croatia	-	8 Jul 1996 a
Czech Republic	-	12 Jun 2000 a
Denmark [2]	18 Mar 1992	28 May 1997 AA
Estonia	18 Mar 1992	16 Jun 1995
European Union	18 Mar 1992	14 Sep 1995 AA
Finland	18 Mar 1992	21 Feb 1996 A
France [3]	18 Mar 1992	30 Jun 1998 AA
Germany	18 Mar 1992	30 Jan 1995
Greece	18 Mar 1992	6 Sep 1996
Hungary	18 Mar 1992	2 Sep 1994 AA
Italy	18 Mar 1992	23 May 1996
Kazakhstan	-	11 Jan 2001 a
Latvia	18 Mar 1992	10 Dec 1996
Liechtenstein	-	19 Nov 1997 a
Lithuania	18 Mar 1992	28 Apr 2000
Luxembourg	20 May 1992	7 Jun 1994
Montenegro		23 Jun 2014 a
Netherlands [4]	18 Mar 1992	14 Mar 1995 A
North Macedonia	-	28 Jul 2015 a
Norway	18 Sep 1992	1 Apr 1993 AA
Poland	18 Mar 1992	15 Mar 2000
Portugal [5]	9 Jun 1992	9 Dec 1994
Rep. of Moldova	-	4 Jan 1994 a
Romania	18 Mar 1992	31 May 1995
Russian Federation	18 Mar 1992	2 Nov 1993 A
Senegal	-	31 Aug 2018 a
Serbia	-	27 Aug 2010 a
Slovakia	-	7 Jul 1999 a
Slovenia	-	13 Apr 1999 a
Spain	18 Mar 1992	16 Feb 2000
Sweden	18 Mar 1992	5 Aug 1993
Switzerland	18 Mar 1992	23 May 1995
Turkmenistan	-	29 Aug 2012 a
Ukraine	-	8 Oct 1999 a
UK of GB & North. Ireland	18 Mar 1992	
Uzbekistan	-	4 Sep 2007 a

Source: *https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5&chapter=27&clang=_en* , accessed on 11 June 2019.

Annexe 3: List of States party to the 1992 UNECE Watercourse Convention and the 1997 UNWCC

Participant	Ratification, Accession (a), Acceptance (A), Approval (AA) to the 1992 UNECE Watercourses Convention	Ratification, Accession (a), Acceptance (A), Approval (AA) to the 1997 UNWCC
Albania	5 Jan 1994	No
Austria	25 Jul 1996	-
Azerbaijan	3 Aug 2000 a	-
Belarus	29 May 2003 a	-
Belgium	8 Nov 2000	-
Benin	No	5 June 2012 a
Bosnia and Herzegovina	3 Dec 2009 a	-
Bulgaria	28 Oct 2003	-
Burkina Faso	No	22 March 2011 a
Chad	22 Feb 2018 a	26 Sept. 2012 a
Croatia	8 Jul 1996 a	-
Czech Republic	12 Jun 2000 a	-
Denmark [2]	28 May 1997 AA	30 April 2012 a
Estonia	16 Jun 1995	-
European Union	14 Sep 1995 AA	-
Finland	21 Feb 1996 A	23 January 1998 A
France [3]	30 Jun 1998 AA	24 Feb 2011 a
Germany	30 Jan 1995	15 January 2007
Greece	6 Sep 1996	2 Dec 2010a
Guinea -B	No	19 May 2010a
Hungary	2 Sep 1994 AA	26 January 2000 AA
Iraq	No	2 July 2001a
Ireland	No	20 December 2013a
Italy	23 May 1996	30 November 2012a
Ivory Coast	No	22 January 1999
Jordan	No	25 February 2014
Kazakhstan	11 Jan 2001 a	-
Latvia	10 Dec 1996	-
Lebanon	No	25 May 1999 a
Libya	No	25 June 2005 a
Liechtenstein	19 Nov 1997 a	-
Lithuania	28 Apr 2000	-
Luxembourg	7 Jun 1994	8 June 2012
Montenegro	23 Jun 2014 a	24 September 2013 a
Morocco	No	13 April 2011 a
Namibia	No	29 August 2001
Netherlands	14 Mar 1995 A	2 January 2001 A
Niger	No	20 February 2013 a
Nigeria	No	27 September 2010
North Macedonia	28 Jul 2015 a	-
Norway	1 Apr 1993 AA	30 September 1998
Paraguay	No	No
Poland	15 Mar 2000	-
Portugal [5]	9 Dec 1994	22 January 2005
Qatar	No	28 February 2002 a
Rep. of South Africa	No	26 October 1998
Rep. of Moldova	4 Jan 1994 a	-

Participant	Ratification, Accession (a), Acceptance (A), Approval (AA) to the 1992 UNECE Watercourses Convention	Ratification, Accession (a), Acceptance (A), Approval (AA) to the 1997 UNWCC
Romania	31 May 1995	-
Russian Federation	2 Nov 1993 A	-
Senegal	31 Aug 2018 a	-
Serbia	27 Aug 2010 a	-
Slovakia	7 Jul 1999 a	-
Slovenia	13 Apr 1999 a	-
Spain	16 Feb 2000	24 September 2009 a
State of Palestine	16 Feb 2000	2 January 2015 a
Sweden	5 Aug 1993	15 June 2000 a
Switzerland	23 May 1995	-
Syria Arab Rep.	No	2 April 1998
Tunisia	No	22 April 2009
Turkmenistan	29 Aug 2012 a	-
Ukraine	8 Oct 1999 a	-
UK of GB & Northern Ireland	-	13 December 2013 a
Uzbekistan	4 Sep 2007 a	4 September 2007 a
Venezuela (Bolivian Rep. of)	No	No
Vietnam	No	19 May 2014 a
Yemen	No	No

Sources: This thesis' own compilation of information that were available at *https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-12&chapter=27&lang=en* accessed on 11 June 2019. and *https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5&chapter=27&clang=_en* , accessed on 11 June 2019.

Annexe 4: the GDP and GDP per capita of the Rhine Basin countries

Country	GDP (in millions US$)	GDP per capita
Austria	455,736.58	51,512.9
Belgium	531,766.94	46,556.1
France	2,777,535.24	41,463.6
Germany	3,996,759.29	48,195.6
Italy	2,073,901.99	34,318.4
Liechtenstein	6,214.63	165,028.2
Luxembourg	69,487.92	114,340.5
Netherlands	913,658.47	53,024.1
Switzerland	705,501.30	82,838.9

Source: *https://data.worldbank.org/indicator ;* accessed on 23 September 2019.

Annexe 5: Water and GDP profiles of the riparian countries of the Danube River

Country	Percent in basin	Percentage of basin in country	Pop. in basin	GDP	GDP per capita	Renewable water/person
Romania	29.0	97.4	21.7	239,552.52	12,301.2	9,486
Hungary	11.6	100.0	10.1	155,703.07	15,938.8	10,541
Serbia & Mont.	11.1	90.0	9.0	50,508.37	7,234	19,815
Austria	10.0	96.1	7.7	455,736.58	57,305.3	9,815
Germany	7.0	16.8	9.4	3,996,759.29	48,195.6	1,878
Bulgaria	5.9	43.0	3.5	65,132.95	9,272.6	2,734
Slovak Republic	5.9	96.0	5.2	106,472.2	19,546.9	9,265
Bosnia & Herz.	4.6	74.9	2.9	19,781.78	5,951.3	8,603
Croatia	4.4	62.5	3.1	60,126.01	14,869.1	22,654
Ukraine	3.8	5.4	2.7	130,832.4	3,095.2	2,868
Czeck Republic	2.9	27.5	2.8	245,225.8	23,078.6	1,283
Slovenia	2.0	81.0	1.7	54,235.48	26,234	16,070
Moldavia	1.6	35.6	1.1	11,309.08	3,189.4	2,726
Switzerland	0.2	4.3	<0.1	705,501.3	82,838.9	7,464
Albania	<0.1	<0.1	<0.1	15,058.88	5,253.6	13,178
Italy	<0.1	0.2	<0.1	2,073,901.99	34,318.4	3,330
Macedonia	<0.1	0.2	<0.1			2,633
Poland	<0.1	0.1	<0.1	585,782.87	15,424	1,598

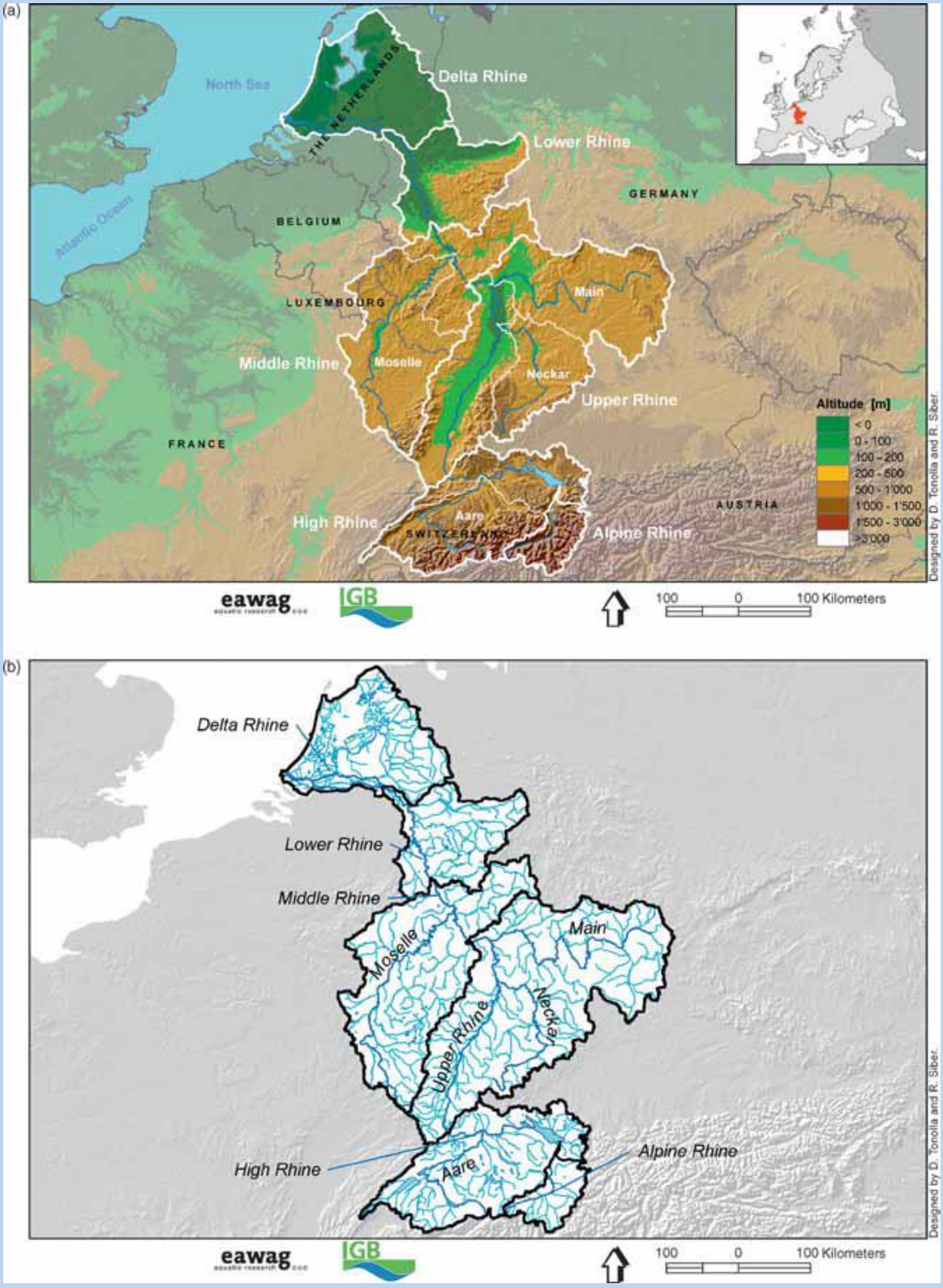
Source: IPCDR, 2006; CIA World Factbook, 2006; World bank group 2019; WRI, 2006) [1724]

[1724] Mckinney (note 1528 above; 51) With some data being updated on the basis of IPCDR (2019), available at *https://www.icpdr.org/main/*, accessed on 20 April 2019; CIA World Factbook (2019) available at *https://www.cia.gov/redirects/ciaredirect.html* , accessed on 20 April 2019; World bank group data portal (2019), available at *https://data.worldbank.org/* , accessed on 20 April 2019; WRI (2019) available at *https://www.wri.org/* , accessed on 20 April 2019.

Annex 6/Map 6: The Congo River born and discharged from within the territory of the DR-Congo's

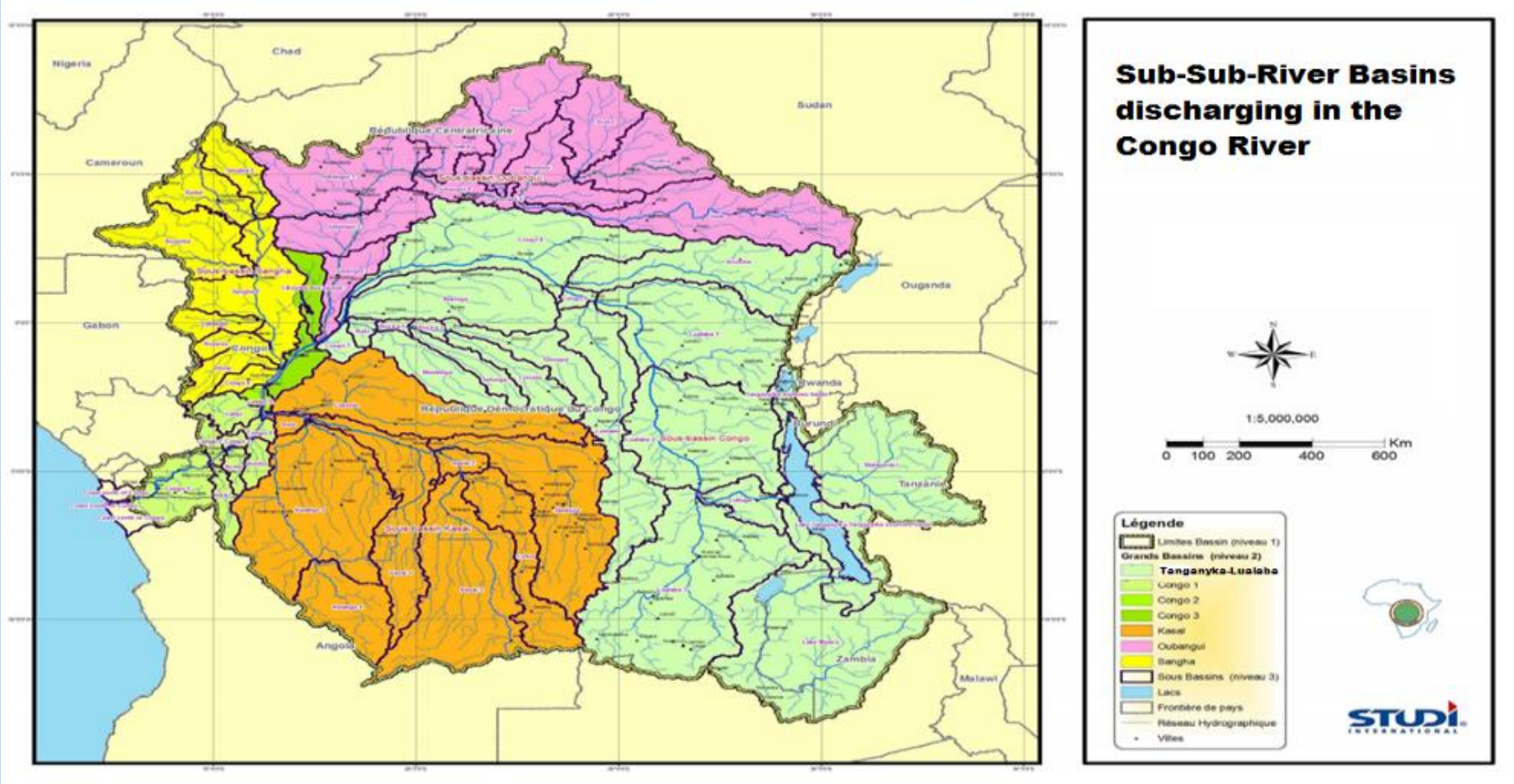
Source: *https://www.britannica.com/place/Congo-River*; *accessed on 11 August 2019*

Annexe 7 / Map 7: The Rhine River Basin



Source: Uehlinger *et al.* (note 1422 above, 201).

Annexe 8 / Map 8: The transboundary sub-rivers and sub-sub-river basins of the tributaries of the Congo River



Source *https://www.cicos.int*